EVALUATION OF THE CLINICAL OUTCOME FOLLOWING LARGE VENTRAL HERNIA REPAIR

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I hereby declare that the thesis entitled "**EVALUATION OF THE CLINICAL OUTCOME FOLLOWING LARGE VENTRAL HERNIA REPAIR**" submitted towards partial fulfillment of the requirements for the award of **MS in General surgery** degree to BFUHS is a compilation of original work carried out by me under the supervision of **Dr. Sanjeev K Singla**, Professor, Department of Surgery and **Dr. Jaspal Singh**, Professor & Head, Department Surgery. No part of this thesis has formed the basis for the award of any degree previously.

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Dedicated

to

my Family,

friends

&

Teachers

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Dr. Harshit Gupta

ABBREVIATIONS

AWR- Abdominal wall reconstruction

ACS- Anterior Component Separation

BMI- Body Mass Index

CST- Component separation technique

COPD- Chronic Obstructive Pulmonary Disease

CT- Computed Tomography

eTEP- Extended view extraperitoneal repair

IPOM - Intraperitoneal Onlay mesh repair

MRI- Magnetic resonance Imaging

PDS- Polydiaoxanone suture

RS- Rives Stoppa technique

SSI- Surgical site superficial infection

TAR- Transversus Abdominis Release

TAPP - Transabdominal Preperitoneal repair

ABSTRACT

EVALUATION OF TECHNIQUE AND POSTOPERATIVE OUTCOMES IN PATIENTS UNDERGOING LARGE VENTRAL HERNIA REPAIR

Introduction: Ventral hernias or Hernias of the anterior abdominal wall, represent protrusion of intra-abdominal or pre-peritoneal contents through defects in the parietal abdominal wall fascia and muscle. Ventral hernias may be congenital or acquired. Acquired hernias may develop via slow architectural deterioration of the muscular aponeurosis or they may develop from failed healing of an anterior abdominal wall incision after laparotomy.

Aim of Study: The objective of the present study is to evaluate the technique and postoperative outcomes in patients undergoing large ventral hernia repair.

Materials & methods: The study was conducted on patients with “large ventral hernia”, admitted to the “Department of Surgery, DMC Hospital, Ludhiana” during the period “July 2019 to June 2021”. The clinical outcome in patients was measured in terms of operation time; hematoma seroma; infection; recurrence of hernia; any other complication The patients were followed up during the hospital stay as well as for three months after discharge from the hospital. Descriptive statistical studies were used to evaluate the data collected. **Inclusion criteria:** 1. The patients were admitted with mid-line “large ventral hernia” with the size of ≥10 cms at its maximum width. 2. Patients consenting to participate in the study. **Exclusion Criteria:** Pregnancy, Peritonitis, Patients on immunosuppressives, Patients already suffering from left heart failure, chronic liver disease, renal failure, pre-existing entero-cutaneous fistula, or skin defect.

Results: The study included 50 consenting patients maximum females patients mostly (70%) above the age of 50 years and 90% of them being overweight/obese who underwent large ventral hernia repair with both anterior as well as posterior component separation technique with a mean duration of surgery being 253.7 minutes. 8(16%) of these patients, developed seroma, 5 (10%) developed surgical site infection and 2(4%) developed recurrence. There was no deep infection, mesh infection, or any significant pain abdomen postoperatively. In none of the patients was the dreaded complication of abdominal compartment syndrome seen.

Clinical Significance: Ventral hernias pose a surgical dilemma in today’s times and it has become essential to define which technique is best suited for the treatment of large ventral hernias with the least complications and least recurrence rate.

Conclusion: “Large Incisional Hernias” can be effectively treated by using the “Component Separation Technique”. Also, that posterior component separation is a better and safer alternative because of lesser complications in the form of surgical site infections and recurrence rate

Keywords: Abdominal wall reconstruction(AWR), Anterior Component separation, Enhanced view- totally extraperitoneal technique, Retromuscular mesh placement, Transversus abdominis release, Ventral, and Incisional hernia repair.

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INTRODUCTION

Hernias are routine general surgical problems that may present in any age group, regardless of the patient's socioeconomic status.[1]

Hernias of the anterior abdominal wall (or, ventral hernias) represent defects in the parietal abdominal wall (either fascia and/or muscle) through which intra-abdominal or pre-peritoneal contents can protrude. Ventral hernias may be congenital or acquired.

Ventral incisional hernias are defects occurring in the abdominal wall at the site of a prior surgical incision, through which intra-abdominal or pre-peritoneal contents can protrude often due to poor wound healing or the failure of tissue healing.[2] Studies have shown that anywhere between 3 and 20 % of patients may develop a ventral hernia after abdominal surgery, especially after midline laparotomy.[2]

Incisional hernias are common post-surgical complications of laparotomy, up to 30 % of all patients develop an incisional hernia. One of the elements that facilitate the development of incisional hernias is generally overstressing of the abdominal wall in the early stages of rehabilitation.

Other risk factors for a ventral hernia include:

Pregnancy, Obesity, History of previous hernias, History of abdominal surgeries, Family history of hernias, Frequently lifting or pushing heavy objects.

With a reported incidence of 2-28%, incisional hernia remains a commonly encountered complication of abdominal surgery.[3-5] Further reports indicate the need for additional surgery to repair an incisional hernia in 26% of the patients undergoing laparotomy because of various indications.[6]

In 17% of the patients undergoing incisional hernia repair, strangulation or incarceration becomes the indication for repair.[7] Patients with incisional hernias often wait for several months before undergoing surgical repair.[8] Symptoms may take weeks or months to appear. The patient may feel absolutely no symptoms or could experience

discomfort or severe pain in the area of your hernia, which might grow worse when tries to stand or lift heavy objects.

A considerable amount of the abdominal contents will lose its “abdominal domain” in long-standing hernias due to abdominal wall weakness & lateral retraction of the muscles which leads to adverse effects on posture maintenance, respiration, micturition, defecation & biomechanical properties. These have a profound impact on a patient's overall physical capacity & quality of life. It becomes clear that the efficacy of ventral hernia repair is of major importance when morbidity is added to the vast numbers & the tremendous costs associated with hernia repair.

For a complete diagnosis, a detailed history and a complete general, as well as physical examination, is required. The imaging tests are of utmost importance to look inside the body for signs of a ventral hernia, which may include:

Abdominal ultrasound, CT, MRI.

Repair of ventral hernia can occur via a laparoscopic or open approach.[9]

Over the years, the “**Component Separation Technique**” has gained importance for the management of large incisional hernias. In 1990 Ramirez et al [10] developed a technique- Anterior Component Separation based on enlargement of abdominal wall surface by translation of muscular layers without severing the innervation & blood supply of the muscles for reconstructing abdominal wall defects without the use of prosthetic material.

Unfortunately, results of incisional hernia repair are disappointing despite significant advances in many areas of surgery, with recurrence rates of suture repair. This technique reported that abdominal wall defects up to 25-30 cm in the waistline can be bridged, and was also found to be useful in both clean & contaminated situations. [10]

Apart from recurrence, mesh implantation is associated with several other complications, with complications rate being almost twice as high with mesh repair compared to primary suture repair. The rate of local

complications - such as infections, seroma, hematoma formation, and subsequent removal of the mesh – remain high with mesh implantations, as depicted by many studies.

The **recurrence** rates are reported to be to the tune of up to two-thirds of the operated cases after suture repair, whereas with the use of mesh, the recurrence rate of up to half of the operated cases is found.

Later in 1993, this technique was further developed by adding separation of the posterior rectus sheath from the rectus abdominis muscle by De Vries Reilingh et al.[11] Geffen et al[12] reported a drop in the recurrence rate to just 3.8% by augmentation of the technique with implantation of mesh between rectus abdominis muscle & the posterior rectus sheath.

Also, ACS faced many problems like, wound complications are commonly encountered.[13] Hematoma, seroma formation, wound infections, and flap necrosis due to division of Para Umbilical Perforator Sparing vessels is very frequent. Estimated recurrence was around 7-32%. [14]

Various limitations of Anterior CST lead to the evolvement of the Rives-Stoppa technique with favorable outcomes and low morbidity. Posterior rectus sheath dissection provides a well vascularised “box” for mesh placement. Because of its excellent arterial supply, the mesh becomes incorporated.

Nowadays, the Transversus abdominis release technique is being more into consideration given management of large ventral hernia repairs, as it offers a reliable, durable solution to complex abdominal wall construction with low recurrence rates and lower morbidity and decreased rates of surgical site infection.[15]

Later in the 1990s pioneers like LeBlanc invented the laparoscopic approach, which was advantageous in terms of early post-op ambulation, shorter duration of hospital stay, minimal post-op pain, earlier return to work, and fewer post-op wound infections.[16]

Lesser mesh infections have been reported in laparoscopic approaches as compared to open approaches. Initially, the IPOM (i.e.

intraperitoneal Onlay mesh repair), TAPP(Transabdominal preperitoneal) repair, and TEP (Totally extraperitoneal) repair in which peritoneum is not breached at all and dissection is done exclusively in the extraperitoneal space, were the approaches used in laparoscopic repair of ventral and incisional hernia. eTEP (extended view Totally Extra Peritoneal) repair is a novel approach in repair of ventral and incisional hernia and is gaining importance over time in view of better outcomes.

No consensus exists on the optimal technique for the repair of complex ventral hernias.[17].

Thus given the challenging problem of the management of large incisional hernia, in association with some of the **potential benefits of "CST**" in the form of its capability to restore lost abdominal domain and its use in both clean & contaminated situations, the **present study was planned.**

In this observational and descriptive study, we aim to show the outcomes of ventral and incisional hernia repair in terms of intra-operative approach used, post-operative complications like pain, recurrence, etc., and the overall cost-effectiveness of the technique.

AIMS AND OBJECTIVES

To evaluate the technique and post operative outcomes in the patients undergoing “Large Ventral Hernia repair"

REVIEW OF LITERATURE

Abdominal wall hernia formation remains the most common complication following laparotomy, reported in approximately 28% of the patients undergoing abdominal surgery.[18] Hernia repair has undergone vast evolution in the last 5 decades. Surgeons have embarked on an incessant search for the “optimal approach” to repair ventral hernias, driven perhaps by their patients’ frustration as well as their own when faced with a failed repair after what initially looked like the “perfect surgery.” These efforts have led to remarkable accomplishments in hernia surgery.

Abdominal wall anatomy as simple it may seem haunts the surgeon when it comes to the occurrence of hernia and when the procedure for repair is to be decided. The anterior abdominal wall forms **the anterior limit of the abdominal viscera** and is defined superiorly by the xiphoid process of the sternum and costal cartilages and inferiorly by the iliac crest and pubic bones of the pelvis.

SURGICAL ANATOMY OF ANTERIOR ABDOMINAL WALL.[19-25] Flat muscles of the abdomen & recti are arranged to form an elastic contractile layer around the abdominal cavity protecting its contents. The broad muscles cross each other by an arrangement designed to strengthen the abdominal wall and diminish the risk of ventral hernias between separated muscle bundles.[19] All the viscera are maintained in position by the tone of muscle, protecting the viscera from external injuries. Anterior abdominal wall from outside to inside consists of

I) **SKIN** Langer’s line runs in the transverse direction. Longitudinal or oblique incisions heal with comparatively broader scars as compared to incisions parallel to Langer’s line as Incision parallel to Langer’s line seems to heal with a narrower & more cosmetic scar because of minimal forces pulling the skin edges apart.[20]

II) **SUPERFICIAL FASCIA** Below the anterior superior iliac spine, has Camper fascia (superficial fatty layer) and Scarpa fascia (deep membranous layer). There is no deep fascia in the abdomen to facilitate movements of respiration.[21]

III) **MUSCLES** Three pairs of broad flat muscles

a) **External oblique muscle:** It originates from lower ribs and courses downwards, forwards, and medially inserts into the iliac crest to the public tubercle.[22]

b) **Internal oblique muscle:** It originates from lateral 2/3rd of the inguinal ligament, iliac crest, and intermediate lip of iliac crest and course opposite to external oblique muscle.

c) **Transversus abdominis muscle:** It originates from the inguinal ligament, thoracolumbar fascia, and the lower six ribs and inserts into the conjoint tendon, forming an aponeurosis that merges with linea alba.

d) **Rectus abdominis muscle:** Two muscles lie edge to edge in the lower part but broader out above, and separated from each other by the linea alba. Typically 3 intersections are found in the muscle at the umbilical, xiphisternum, and one between them. At the tendinous intersection, the fibers blend inseparably with the rectus sheath's anterior layer thus preventing retraction of rectus in transverse incisions. The muscles may be retracted laterally but not medially because of segmental nerves entering the lateral border.[23]

IV) **Rectus sheath**: It is a musculoaponeurotic sheath that envelopes the rectus abdominis and pyramidalis muscle on each side of line alba, acts as a retinaculum, and prevents the muscle from bowstringing. It includes rectus abdominis muscle, pyramidalis muscle, inferior epigastric artery and vein, superior epigastric artery and vein, terminal parts of 7^{th} to 12^{th} subcostal nerves along with their collateral branches.[24]

V) **Transversalis fascia**: It covers the deep surface of the transversus abdominis muscle and forms a complete facial envelope around the abdominal cavity. This general fascia serves to bind together the muscle and aponeurotic fascia into a continuous layer and reinforce weak areas.

VI) **Linea alba**: It is a strong midline fibrous structure between the two recti, produced by the interlacement of aponeurotic fibers of three flat

muscles of the abdomen. It is attached to the xiphoid above and pubic symphysis below.

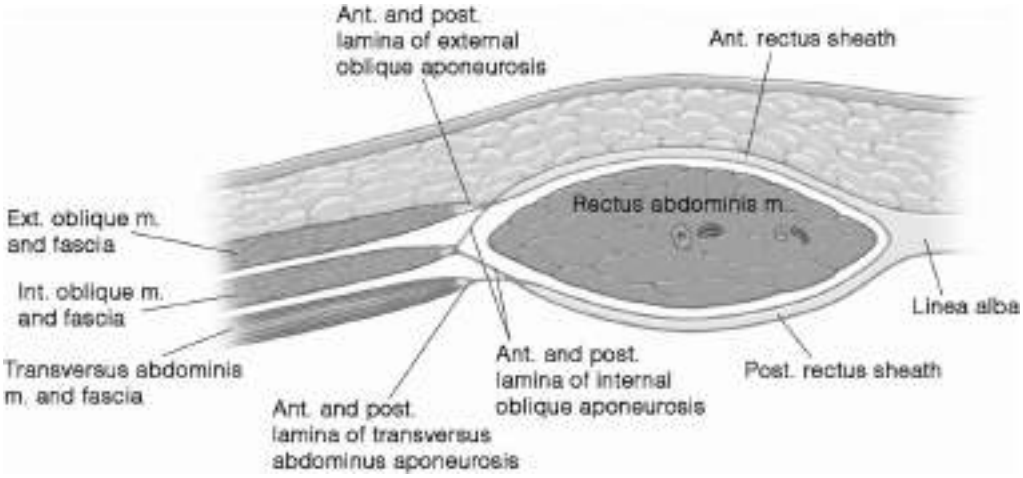
Ant. and post. lamina of external oblique aponeurosis
Ant. rectus sheath
Rectus abdominis m.
Ext. oblique m. and fascia
Int. oblique m. and fascia
Linea alba
Transversus abdominis m. and fascia
Ant. and post. lamina of internal oblique aponeurosis
Post. rectus sheath
Ant. and post. lamina of transversus abdominus aponeurosis

Figure 1:- Anatomy of anterior abdominal wall

Nerve supply: The nerve supply of the anterior abdominal wall is segmental and related to specific spinal levels. The motor supply to the rectus abdominis muscles, the internal oblique, and the transversus abdominis muscles run from the anterior spinal rami of the T6 to T12 levels.[25]

Blood supply: Superior epigastric artery and inferior epigastric artery are the major vessels that supply the anterior abdominal wall. Subcostal & lumbar arteries also contribute to the arterial supply of the abdominal wall through its collateral branches.[25] Neurovascular bundles mainly lie in between the transversus abdominis and internal oblique muscle. Within the rectus sheath, it passes between the posterior aspect of the rectus abdominis muscle and the posterior wall of the rectus sheath.

Lymphatic drainage - The lymphatic drainage of the anterior abdominal wall is mainly to the major lymph nodes in the superficial inguinal and axillary regions. The area above the umbilicus is draining into an axillary group of lymph nodes and the area below the umbilicus is draining into superficial inguinal lymph nodes.

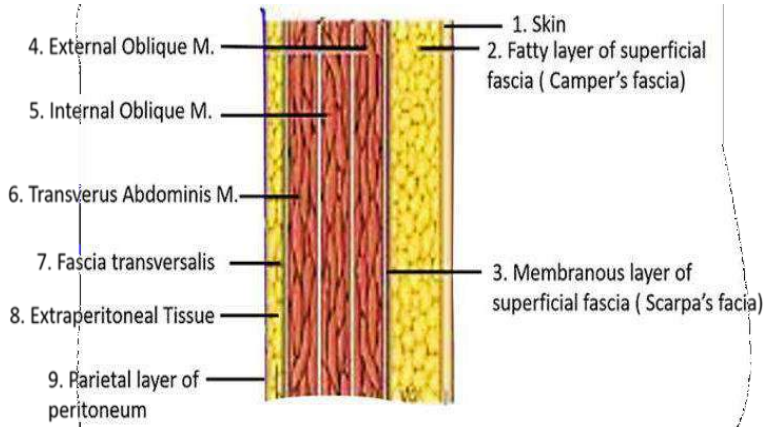
1. Skin
2. Fatty layer of superficial fascia (Camper's fascia)
4. External Oblique M.
5. Internal Oblique M.
6. Transverus Abdominis M.
7. Fascia transversalis
8. Extraperitoneal Tissue
9. Parietal layer of peritoneum
3. Membranous layer of superficial fascia (Scarpa's facia)

Figure 2:- Layers of anterior abdominal wall

VENTRAL HERNIA

A ventral hernia is a protrusion of abdominal contents through the anterior abdominal wall fascia and the defects can be categorized as spontaneous or acquired or by their location on the abdominal wall. Epigastric hernias occur from the xiphoid process to the umbilicus, umbilical hernias occur at the umbilicus, and hypogastric hernias are rare spontaneous hernias that occur below the umbilicus in the midline. Acquired hernias typically occur after surgical incisions and are therefore termed incisional hernias.

Incidence

15 to 20 % are incisional hernias and epigastric hernias account for 10% of hernias according to western operative statistics.[26] Incisional hernias are twice more common in women than men. Some technical and patient-related factors have been linked to the occurrence of incisional hernias but there is no evidence showing the type of suture at the primary operation affecting hernia formation.[26]

The first revolution in hernia surgery came with the concept of tension-free fascial closure with mesh as the recurrence rates were higher with the initial primary fascial closure. Soon enough, mesh repair became the gold standard for elective ventral hernia repair. The second revolution came later when Dr. Rene Stoppa, Jean Rives, and George Wantz explored the retromuscular and preperitoneal planes of the abdominal wall, contributing to significant refinements in surgical

techniques, initially described for the inguinal region.[27] In this technique, mesh now could be placed in a space that was well-vascularized and entirely excluded from the bowel. Because it involved releasing the rectus muscle from its fascial compartment and provided 5 cm of medial advancement on each side of the abdomen, this was the first true myofascial release.[28] The third revolution in hernia surgery was started by Dr. Oscar Ramirez by describing the anatomic components separation of the abdominal wall, which became what is now known as “abdominal wall reconstruction.”[29] Despite wide fascial advancement and improved functional outcomes of anterior component separation (ACS) described by Ramirez, this technique encountered significant wound morbidity at rates as high as 50% even in the presence of peri-umbilical perforators sparing.[30,31]

Although the Rives-Stoppa retro muscular repair has gained popularity and become the global “standard approach” for incisional hernia repairs, larger hernias posed a difficult challenge to the surgeon who aimed at achieving a primary fascial approximation in the absence of undue tension as with this technique, it was not sufficient to adequately fix larger and more complex defects. This technique, while preserving blood supply to subcutaneous tissue and skin allowed for significant myofascial advancement and wide mesh overlap in the sublay position. It is obvious that the procedure of Anterior Component Separation and RS is not adequate for large and complex abdominal wall defects. Some modifications of the technique were reported but the limited advancement of the rectus abdominis muscle makes them inappropriate.[32, 33]

A novel approach to posterior component separation by Transversus Abdominis muscle Release was reported by Novitsky et al IN 2012.[10] The technique is a modification of the classical Rives-Stoppa technique, with the creation of a wide space between the transversus abdominis muscle and fascia transversalis- peritoneum complex in which the transversus abdominis muscle is released medial to the linea semilunaris to expose a broad plane that extends from the central

tendon of the diaphragm superiorly, to the space of Retzius inferiorly, and laterally to the retroperitoneum.

Myofascial releases. One of the main principles of abdominal wall reconstruction is to re-establish the linea alba.

Restoration provides the advantage of a functional abdominal wall, protects the mesh from superficial wound issues, and results in a stronger repair.[34]

Posterior rectus sheath incision with retro muscular mesh placement. In this technique, the mesh is placed in the preperitoneal space. The space is dissected laterally on both the sides of the linea alba at a distance of 8 to 10 cm from the defect after incising the posterior rectus sheath.[34]

Posterior component separation. The retro rectus space is bordered laterally by linea semilunaris. Further advancement can be achieved by incising the posterior rectus sheath about 1 cm medial to the linea semilunaris. To make access to the preperitoneal plane, the posterior leaflet of the internal oblique and the transversus abdominis muscle is incised and further this plane can be extended to the retroperitoneum and then into the psoas muscle.[35] Large sheets of prosthetic mesh can be placed in this location with wide defect coverage.[36]

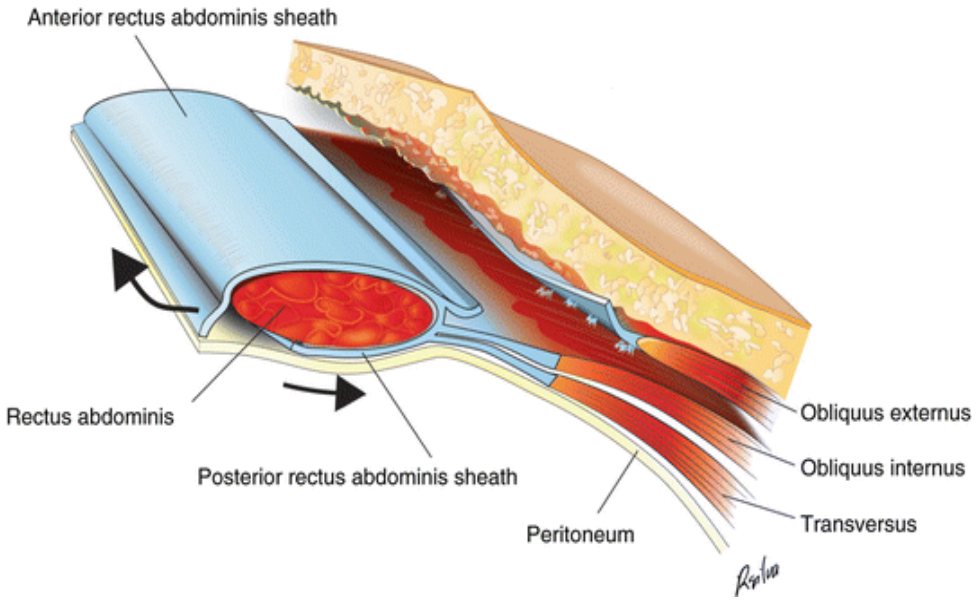

Figure 3:- Plane for posterior component seperation

Endoscopic component separation. One of the major limitations of open component separation is that large skin flaps are necessary to access the lateral abdominal wall musculature, given which, innovative, minimally invasive approaches to component separation have been described.[37] Typically, this is performed by a direct cutdown through a 1-cm incision off the tip of the 11th rib overlying the external oblique muscle, which then is split in the line of its fibers, and a standard bilateral inguinal hernia balloon dissector is placed in between the external and internal oblique muscles, toward the pubis.[38] Three laparoscopic trocars are placed in the space, the dissection is done from the pubis to several centimeters above the costal margin. After the identification of linea semilunaris, the external oblique is incised from beneath the muscle, 2 cm lateral to the linea semilunaris. The muscle is released from the pubis to several centimeters above the costal margin which is done bilaterally.

It has been observed that mesh infections in patients following laparoscopic ventral hernia repair occurred in less than 1% of cases.[39] Hence, becoming one of the biggest advantages of the laparoscopic approach for repairing ventral hernias.[40,41]

The enhanced view totally extraperitoneal (eTEP) technique is a new technique for the repair of ventral and incisional hernias.

A G Gangura conducted a study in 2014 demonstrating Surgical treatment of large median incisional hernia using the prosthetic mesh introduced behind the rectus abdominis muscle sheath procedure (Rives-Stoppa procedure). A number of 77 large incisional hernias located on the midline of the abdomen were operated following the Rives-Stoppa procedure, in a period of five years (2006-2011), in the Surgery Clinic I of the University Hospital Bucharest. The study group mainly included the patients with mean age – of 62 years, the predominance of females - 63 cases (82%), the rate of obesity - 26 observations (34%). Immediate postoperative morbidity was represented by (no. cases): thrombophlebitis (3), prolonged postoperative ileus (6), seroma (12) extended hematic drainage (5),

hematoma (4). Late postoperative complications included granulomas (4) and recurrence (2).[42]

A study conducted by **Opera V** described the effectiveness of TAR (Transversus Abdominis muscle technique) for large incisional hernia repair in which 24 patients (14 males) with large median ventral incisional hernias were evaluated. The recurrence in various degrees was present in 18 patients (75%). The average size of the defect was 18.3 cm. in width (12 to 28 cm.). Five patients (21%) developed various wound complications requiring reoperation. Follow-up between 2 and 18 months (11,8 months) without recurrence. This study concluded that TAR seems to be the "ideal" approach for complex hernias with good immediate outcomes.[43]

Novitsky et al in 2012 described three main advantages to this approach.[44] First, TAR results in significant medial mobilization of the posterior rectus sheath. Second, it allows for extensive lateral dissection in a potentially unlimited space between the transversus abdominis muscle and the underlying transversalis fascia/peritoneum. Finally, the neurovascular bundle to the rectus abdominis and anterolateral abdominal wall skin is preserved. Overall, the TAR technique allows restoration of the biomechanics of the abdominal wall along with tension-free repair with a large mesh.

Recently **Eham Arora** conducted a study in 2020 in which 12 primary and 88 incisional hernia cases underwent TAR with prosthetic mesh repair during the study period. Mean age was 52.5 years, mean BMI was 30.87 kgs/m^2, mean ASA class 1.95. All patients underwent preoperative CT scans and the mean defect was 140.18 cm^2. The average mesh area was 1344 cm^2. Readmission rate at 1 month was 3%, for wound complications with 9 surgical site infections, 17 surgical site occurrences, 10 of which needed procedural interventions. The study recorded no recurrences at a mean follow-up duration of 20.2 months.[45]

Raftopoulos I et al. did a Comparison of Open and Laparoscopic Prosthetic Repair of Large Ventral Hernia with the objective to

compare open with laparoscopic ventral hernia repairs. Fifty laparoscopic and 22 open ventral hernia repairs were included in the study. All patients underwent a tension-free repair with retro muscular placement of the prosthesis. No significant difference between the 2 groups was noted regarding patient demographics and hernia characteristics except that the population in the open group was relatively older (59.4 vs 47.82, P<0.003). They found no significant difference in the operative time between the 2 groups (laparoscopic 132.7 min vs open 152.7 min). Laparoscopic repair was associated with a significant reduction in the postoperative narcotic requirements (27 vs 58.95 mg IV morphine, P<0.002) and the lengths of nothing by mouth (NPO) status (10 vs 55.3 hrs, P<0.001), and hospital stay (1.88 vs 5.38 days, P<0.001). The incidence of major complications (1 vs 4, P<0.028), the hernia recurrence (1 vs 4, P<0.028), and the time required for return to work (25.95 vs 47.8, P<0.036) were significantly reduced in the laparoscopic group.[46]

Jaini Gala[47] in her study compared the anterior and posterior component separation techniques for large ventral hernias. 25 patients each underwent ACST and TAR during the study period. Mean age was 53.5 and 52.8 years and mean BMI was 31.4 and 29.5 respectively. The mean defect area was 120.8 cm2 and 131.9 cm2, and the average mesh size was 741.8 cm2 and 1429.04 cm2 respectively in the ACST and TAR groups. Four patients undergoing TAR had intra-operative complications with none in the ACST group. In the ACST group, 8 patients had an SSI, of which 5 patients needed operative intervention, while 3 patients in the TAR group had an SSI, all of whom were managed with bedside procedures. One patient in the ACST group had a recurrence. None of the patients in the TAR group had a recurrence.

MATERIAL & METHOD

SOURCE OF DATA:

The study was conducted on patients with “large incisional hernia”, admitted to the “Department of Surgery, DMC Hospital, Ludhiana” during the period “July 1, 2019, to June 30, 2021”.

METHOD OF COLLECTION OF DATA

INCLUSION CRITERIA

1. The patients admitted with mid-line “large ventral hernia” with the size of ≥10 cms. at its maximum width.
2. Patients consenting to participate in the study.

EXCLUSION CRITERIA

1. Pregnancy.
2. Peritonitis.
3. Patients on immunosuppressives or suffering from cancer.
4. Patients already suffering from left heart failure due to any cause, chronic liver disease, or renal failure.
5. Pre-existing entero-cutaneous fistula, ostomy, skin defect.
6. Patients already suffering from respiratory compromise, i.e. COPD.

METHODS

Age, gender, abdominal surgery history, BMI, COPD, diabetes, smoking status, constipation, prostatism, site & size of abdominal wall defect & symptoms were some of the recorded factors. Routine investigations including hemogram, renal function tests, coagulation profile, chest x-ray, and electrocardiogram are done in all patients. Apart from the routine investigations, CT Scan abdomen, i) to measure the hernia defect; ii) to see all other hernias e.g. ostomy site hernia iii) to know about the condition of abdominal muscles; iv) to measure the loss of domain, was done for every patient. All efforts were made to eliminate any local skin infection etc. pre-operatively. Patients were kept nil per orally to solids 8 hours before surgery and clear liquids 2 hours prior.

SURGICAL STEPS

The procedure was started by midline laparotomy incision and removal of all previously implanted synthetic material (mesh), if any. Complete adhesiolysis, involving the anterior abdominal wall and dense interbowel adhesions, was performed to create a maximally mobile abdominal wall.

- Then dissection in the subcutaneous space was started just ventral to the rectus sheath, in a lateral direction up to about 1-2 cm lateral to the rectus muscle at the junction of the rectus sheath and the aponeurosis of the external oblique muscle. This dissection was routinely performed with diathermy. It was ensured to **leave the skin & subcutaneous layer intact & as thick as possible**, thus trying to prevent skin necrosis.
- Special care for **"Para Umbilical Perforator Sparing (PUPS)"** was taken whenever deemed necessary.
- Then the actual relaxing incision was placed with a (new) scalpel, just lateral to the fore mentioned junction, in a semilunar shape, parallel to the lateral border of the rectus muscle **taking care not to incise the aponeurosis of the underlying internal oblique muscle as well**.
- Confirmation was obtained visually from the direction of the exposed underlying muscle fibers.
- This incision was proceeded in cranial direction, to a level above the costal margin, which is covered by the external oblique, serratus anterior & the pectoralis muscles. The incision in the caudal direction was limited by the proximity of the inguinal canal which should not be opened routinely.

After that, the external oblique muscle was fixed with graspers & lifted. Then the **actual separation of the external & internal oblique muscles** was done till the level of the posterior axillary line. As the dissection progressed laterally, bleeding spots were best treated by direct gauze tamponade.

The second step of the “CST” is **separating the posterior rectus sheath from the rectus abdominis muscle.** An incision was made on the posterior sheath 0.5 cm away from its medial edge at the level of umbilicus thus, initiating the creation of the retro rectus space. After the identification of the rectus abdominis muscle, the incision was extended cranially and caudally on the entire length of the Rectus sheath and the retro-rectus space was developed by blunt or sharp dissection. Laterally the dissection was extended to the semilunar line. This plane was continued by cranial dissection to the retro-xiphoid plane and caudally in the pre-peritoneal space of Retzius with identification of both Cooper’s ligaments and pubic symphysis along with preserving the epigastric vessels and of the neurovascular branches of the Rectus Abdominis muscle which perforate the posterior sheath just medial to Spiegel line. This was the approach described by Rives Stoppa for large ventral hernias.

Next was to expose the underlying transversus abdominis muscle which was carried out by incising the posterior rectus sheath in the upper third of the abdomen, 0.5 cm medial to the perforating neurovascular bundles of the thoracoabdominal nerves. The exposed fibers of the muscle are then divided along its entire medial edge.

Next, a new pre-peritoneal plane was created between the transversus abdominis muscle on one side and fascia transversalis and peritoneum on the other side. The undersurface of the lateral border of the transversus abdominis muscle was freed from the fascia transversalis and peritoneum with a mounted swab and the psoas muscle was used as a landmark for the extent of lateral dissection.

The cranial extent of the dissection depended on the extent of the defect and inferiorly the pre-peritoneal plane is contiguous with the space of Retzius in the median line and with the space of Bogros on its lateral part. All the peritoneal tears were repaired with an absorbable suture (3-0 Vicryl).

The posterior sheath was then reapproximated on midline with running, delayed absorbable suture (PDS 2-0) after the release was completed on both sides.

This was followed by the placement of 30 x 30 cm soft prolene mesh in sublay position in a diamond configuration, occupying all the retromuscular, preperitoneal, and retroperitoneal spaces. After placing two large suctions drains over the mesh, anterior fascial closure was done using running Prolene no. 1 suture, followed by approximation of skin and subcutaneous tissue using Ethilon 2-0 or skin staplers.

The extended view totally extraperitoneal (eTEP) technique is a novel technique for the repair of ventral and incisional hernias.

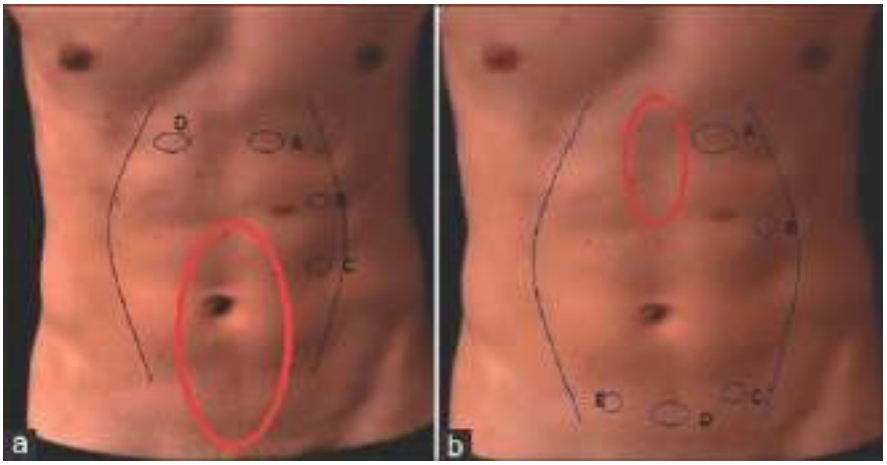

Figure 4:- Port positions. (a) for umbilical and infraumbilical hernia; (b) for supraumbilical hernia

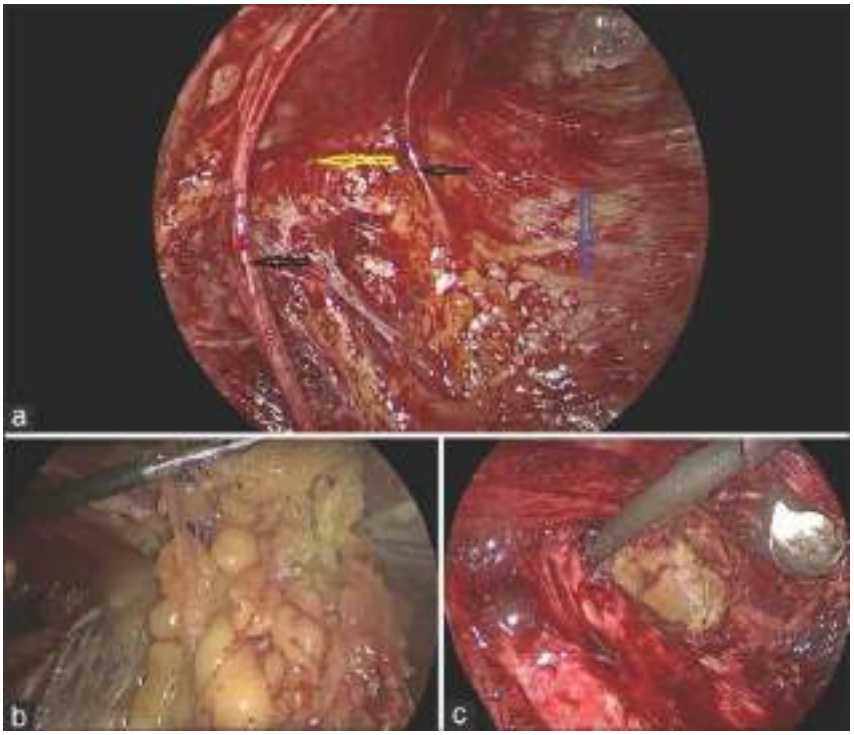

Figure 5:- (a) Creation of retro-rectus space. Note the neurovascular bundles - black arrow, Linea Semilunaris - yellow arrow, posterior rectus sheath - blue arrow (b) intraperitoneal dissection and taking down hernia contents (c) crossing the midline. Note the falciform pad of fat

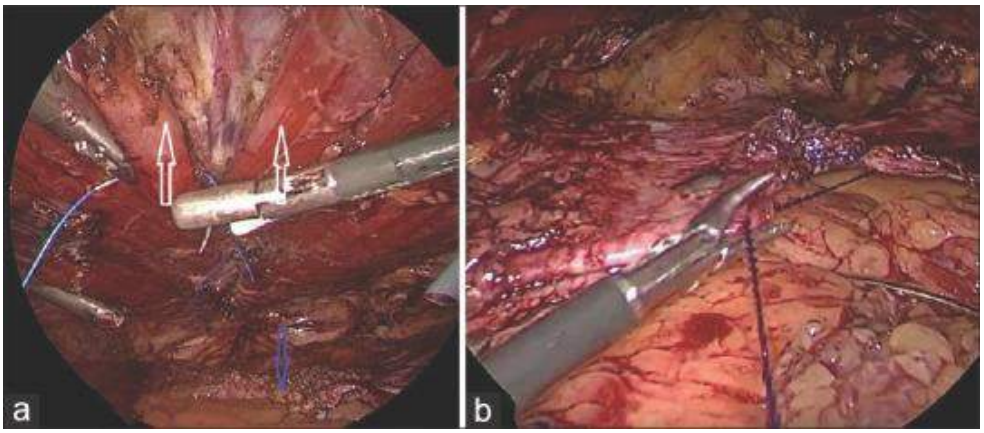

Figure 6:- (a)Closure of linea alba. Rectus abdominis are marked with white arrows (b) closure of posterior rectus sheath

Figure 7:- Transversus abdominis release. TA fibers are marked with a black arrow

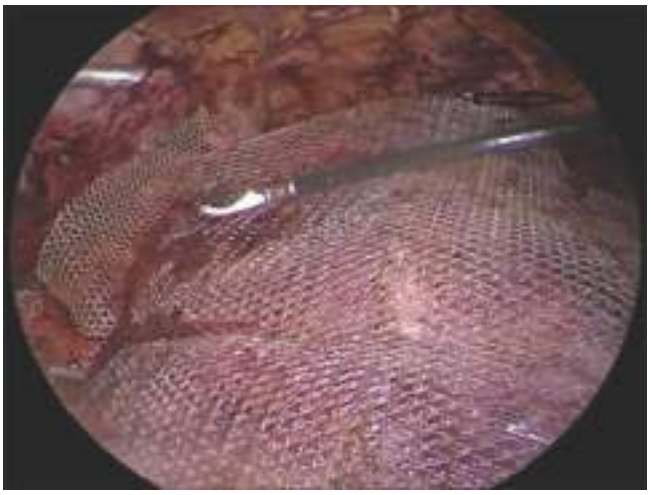

Figure 8:- Mesh placement. The pubic bone is marked with an arrow

Mesh can be left without fixation also. We did not use any fixation technique in our patients.

The **advantages** were rapid and effortless creation of large extraperitoneal space with more flexible port placement. It is also useful for obese patients and those with a short distance between umbilicus and pubis or multiple previous pelvic surgeries. Drains are kept to prevent seroma formation and instruments are removed under direct vision. Ports are closed using a stapler or nonabsorbable synthetic suture (Ethilon 2 0'). Antiseptic dressing using primapore to cover the staples and pressure bandage using dynaplast is done.

Postoperatively strict bed rest was advised for 3 days. Drains were removed until the 5th postoperative day or till the drain output dropped

to <30ml per day.

All of the patients were encouraged to ambulate on postoperative day 1 with an abdominal binder applied. Pain assessment is done using the VAS score ranging from 0-10 with 0 being no pain, 1-3 being mild pain, 4-6 being moderate pain, 7-9 being severe pain and 10 being the worst imaginable pain. The preoperative VAS pain score is compared to the postoperative VAS pain score at 3 months post-operative.

DURATION OF STUDY

The study was conducted on patients with “Large ventral Hernia”, admitted to “DMC Hospital, Ludhiana” during the period “July 1, 2019, to June 30, 2021”.

OUTCOME

The clinical outcome in patients was measured in terms of:

a) operation time;

b) hematoma;

d) seroma;

e) infection;

f) hospital stay time;

h) occurrence of pain abdomen (by visual analog scale);

i) recurrence of hernia;

j) Any other complication

The patients were followed up during the hospital stay as well as for three months after discharge from the hospital.

OBSERVATIONS AND RESULTS

This study was conducted on 50 consenting patients with mid-line "large Ventral Hernia" with the size of ≥10cms at its maximum width. They were followed up during the hospital stay as well as for three months after discharge from the hospital. Following observations were made:

AGE

The age of the patients ranged from 40 to 72 years of age. The mean age was 57.2 years. The majority of the patients were above 51 years of age (72.0%) and nearly 2/5th of the patients were above 61 years of age.

Table1: Age Distribution

Age (years)	No. of cases	Percentage
< 40	3	6.0%
41-50	11	22.0%
51-60	14	28.0%
61-70	18	36.0%
> 70	4	8.0%
Total	50	100.0%

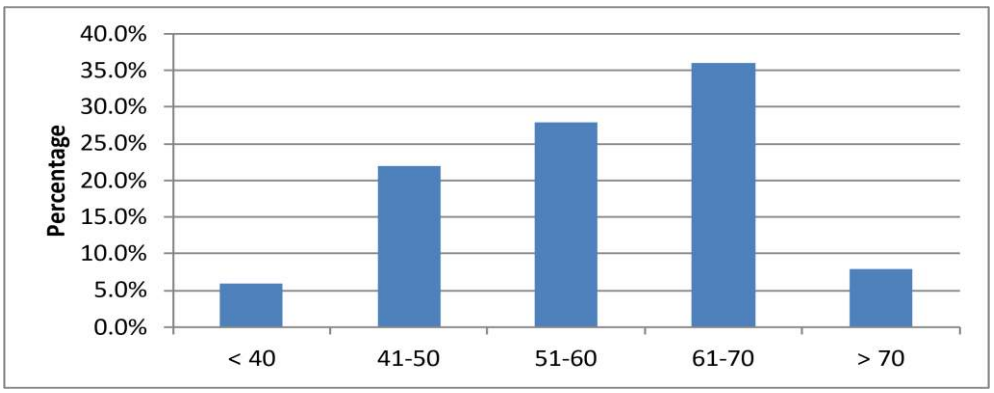

Figure 9:- Age distribution

GENDER

In this study, there was a predominance of females (66.0%) as compared to males (34.0%).

Table 2: Gender Distribution

Gender (M/F)	No. of cases	Percentage
F	33	66.0%
M	17	34.0%
Total	50	100.0%

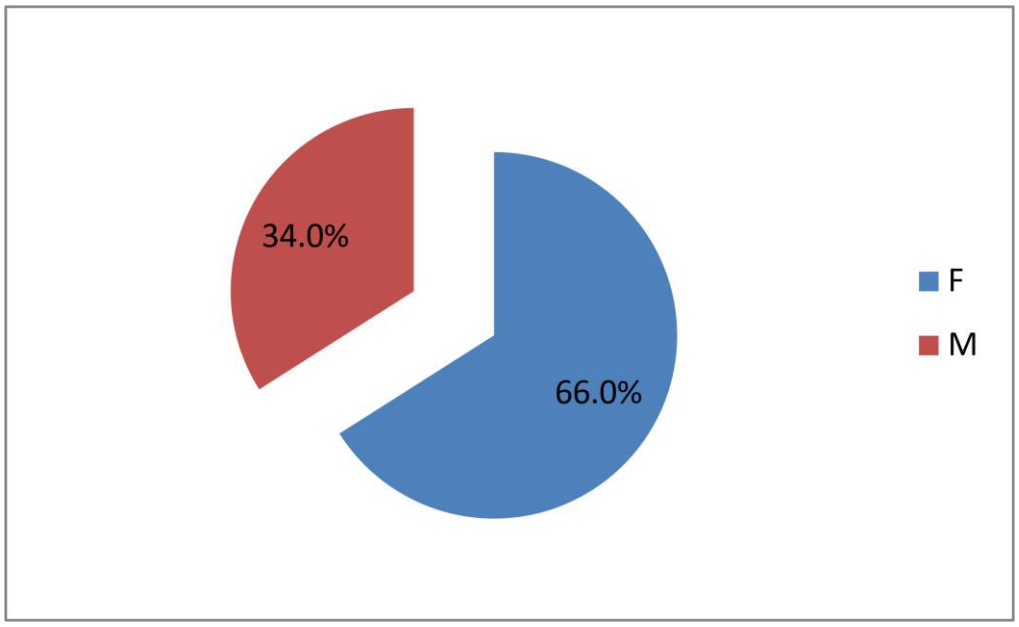

Figure 10:- Gender distribution

BMI OF PATIENTS

The BMI of the patients in the study ranged from 22 to 37 kg/m^2 of body surface area with a mean of 29.8 kg/m^2 of body surface area. Only 3(6.0%) patients had a BMI less than 25 whereas more than half the patients were obese with BMI >30 or morbidly obese with BMI>35.

Table 3: BMI distribution

BMI	No. of cases	Percentage
< 24.9	3	6.0%
25-29.9	18	36.0%
> 30	29	58.0%
Total	50	100.0%

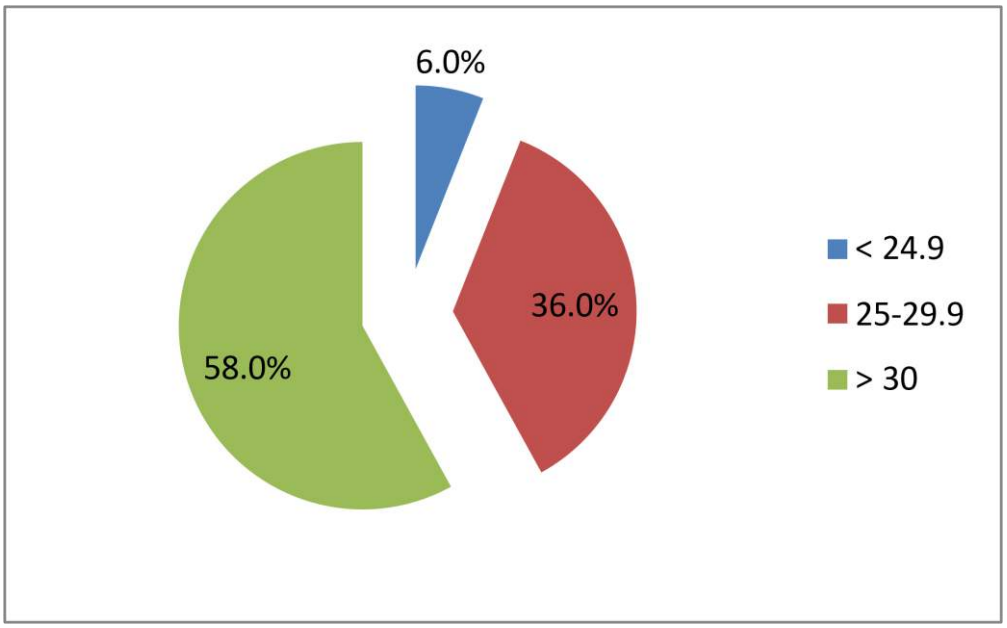

Figure 11:- BMI Distribiution

ASSOCIATED COMORBID CONDITIONS

32.0%(16 patients) complained of constipation, 36.0%(18 patients) of the patients had Diabetes mellitus as a coexisting disease and 10.0%(5 male patients) of the total patients had symptoms suggestive of prostatism. 4.0%(2 patients) gave a history of smoking and 8.0%(4 patients) had a history of asthma but there was no evidence of COPD in the patients having a history of smoking or asthma as confirmed by spirometry.

Table 4: Comorbid Conditions

	No. of cases	Percentage
Diabetes	18	36.0%
constipation	16	32.0%
Asthma	4	8.0%
Smoking	2	4.00%
Prostatism	5	10.0%

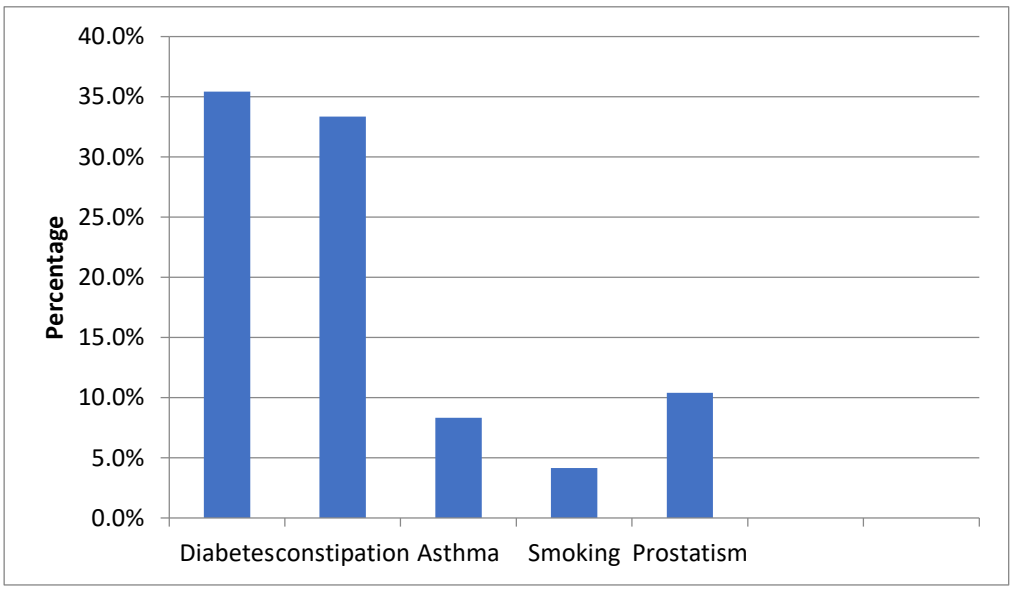

Figure 12:- Comorbid conditions

PREVIOUS ABDOMINAL SURGERY

Exploratory Laparotomy for perforation peritonitis was the single largest reason for the occurrence of hernia in our study 17 of the total 50 patients (34.0%). 15(30.0%) of the total patients had a history of obstetric or gynecological surgery and 10(20.0 %) had a history of hernia repair surgery in the past.

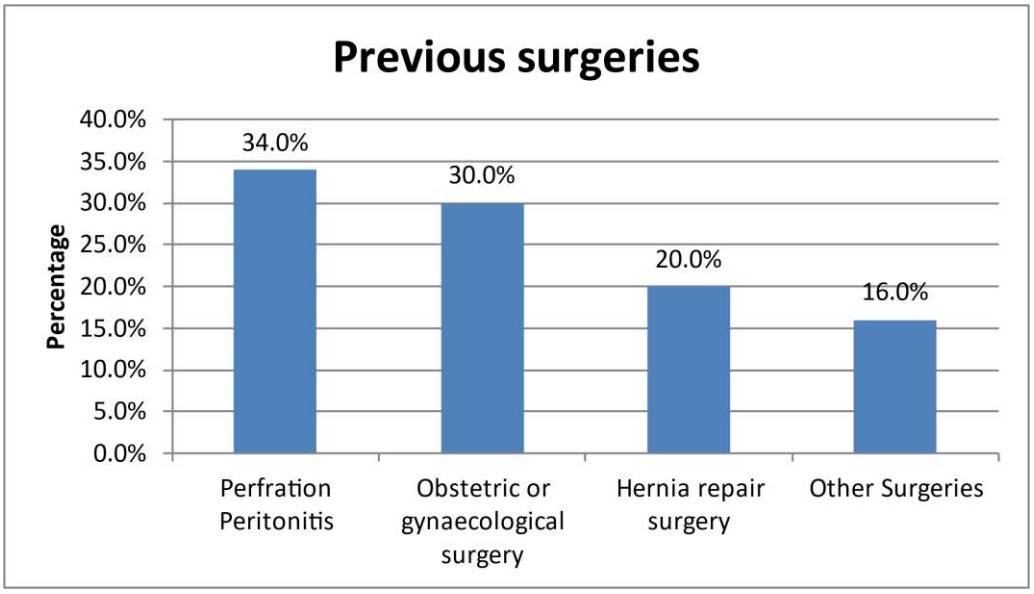

Figure 13:- History of previous abdominal surgeries

SYMPTOM/S AT THE TIME OF PRESENTATION

It was observed that patients presented for surgery either when the hernia became apparent and was causing discomfort in daily life- 38 (76.0 %), cosmetic problems-27 patients (54.0 %), and chronic back pain- 15 (30.0 %). Some patients had more than one cause as well.

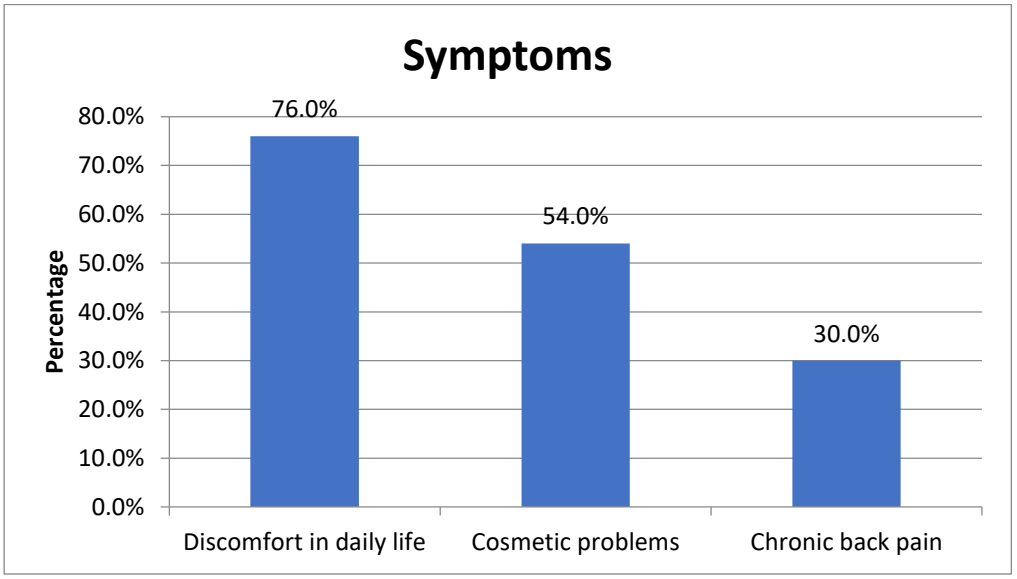

Fig 14: Presenting Symptoms

OPERATING PROCEDURES

All the patients who presented with large midline ventral hernias underwent component separation. 10 patients underwent Anterior component separation whereas, 40 patients underwent posterior component separation of which 24(48.0%) patients underwent open TAR. In 4(8.0%) patients, eTEP TAR was done. The rest of the 12 (24.0%) cases underwent open RS procedure.

Table 5: Operating techniques

Procedure	No. of cases	Percentage
ACS	10	20%
OPEN RS	12	24.0%
OPEN TAR	24	48.0%
eTEP TAR	4	8.0%

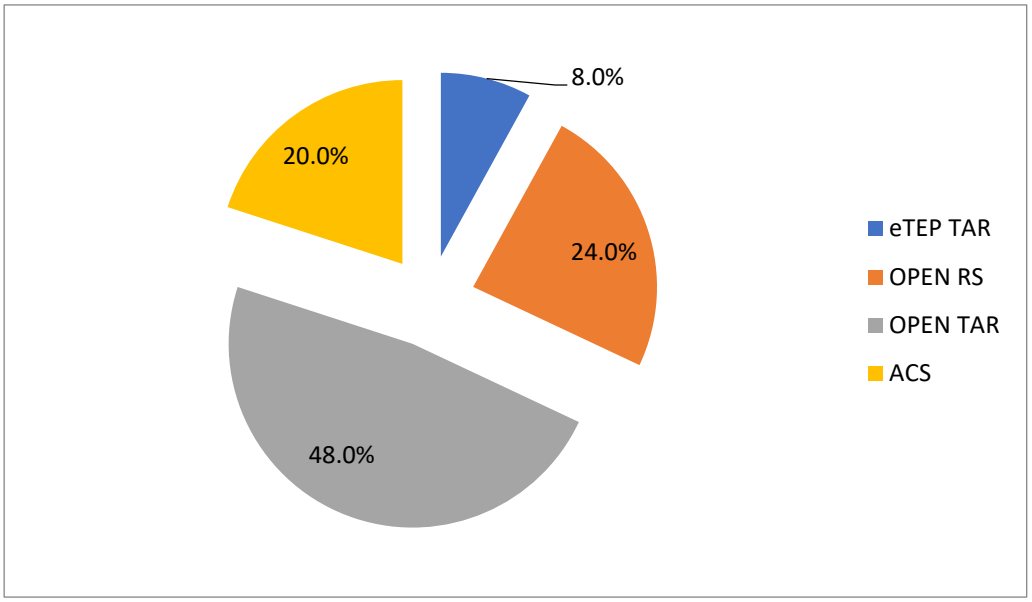

Figure 15:- Operating techniques

OPERATION TIME

The operation time had a wide variation ranging from 90 minutes to 420 minutes with a mean time of 253.7 minutes. However, 60% of cases were operated upon within 270mins.

Table 6: Duration of surgery

Duration of surgery (min)	No. of cases	Percentage
Less than 180	7	14.0%
180 to <240	10	20.0%
240 to <300	22	44.0%
300 to <360	11	22.0%
Total	50	100.0%

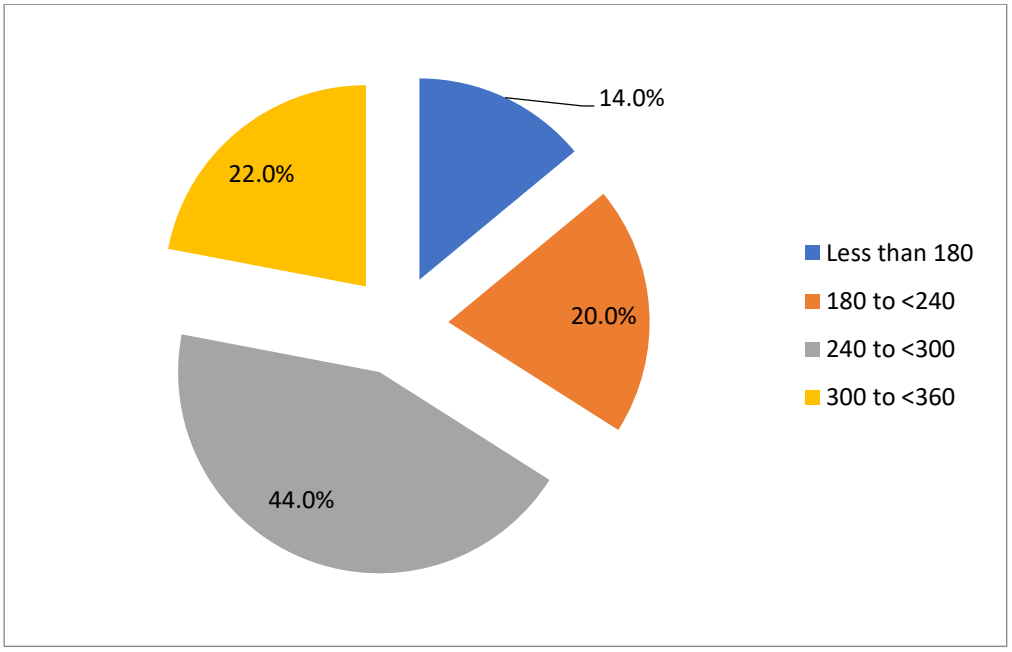

Figure 16:- Operation time

INTRAOPERATIVE

In all patients, soft prolene mesh was used.

15 x 15 cm mesh was placed onlay in patients undergoing Anterior Component separation.

30 x30 cm mesh was placed in the prefascial plane in patients undergoing Posterior Component separation.

Table 7:- Mesh used

Intra op Mesh	No. of cases	Percentage
15X15 cm, ONLAY	10	20.0%
30x30cm, PREFASCIAL	40	80.0%
Total	48	96.0%

Average blood loss varied from 25 ml to 450 ml with a mean value of 219.9 ml.

No other major complication was encountered during the study.

POSTOPERATIVE

On average, nearly 80% of the patients were started orally within 3 days post-surgery. Patients who underwent endoscopic repair were started orally the next day.

TIME TAKEN FOR REMOVAL OF DRAINS

Nearly 4/5ths of the drains were out by the end of the 1st week of surgery, and all drains were removed by day 10. The duration of drain removal was longer in the ACS group which could be explained by large subcutaneous flap dissection.

Table 8: Drain removal time

Drain removal on day	No. of cases	Percentage
On day 5	19	38.0%
Up to 7 days	38	76.0%
Up to 10 days	50	100%

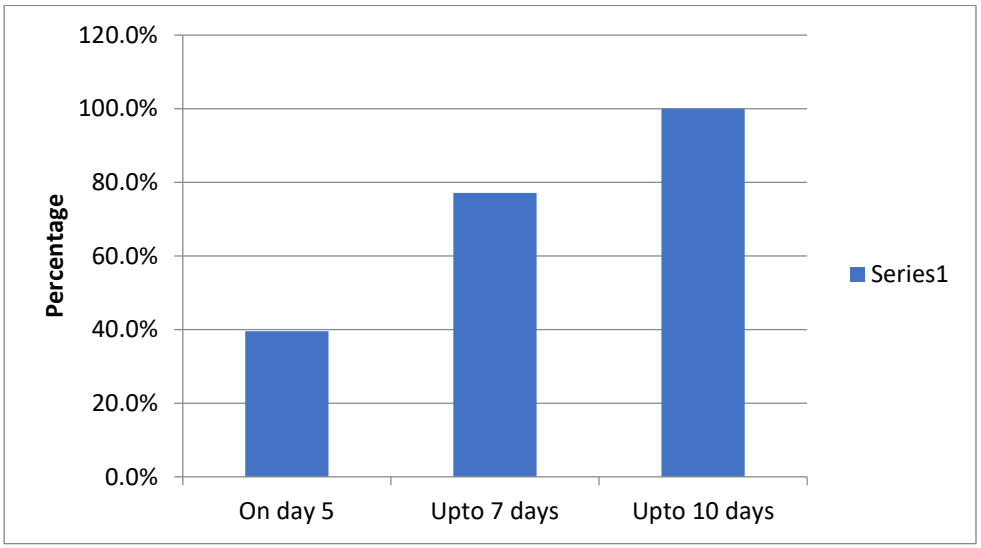

Figure 17:- Time taken for removal of drain

HOSPITAL STAY TIME

Patients in this study were hospitalized for 6 to 13 days with a mean period of 9.7 days. All the patients were discharged within 2 weeks of admission.

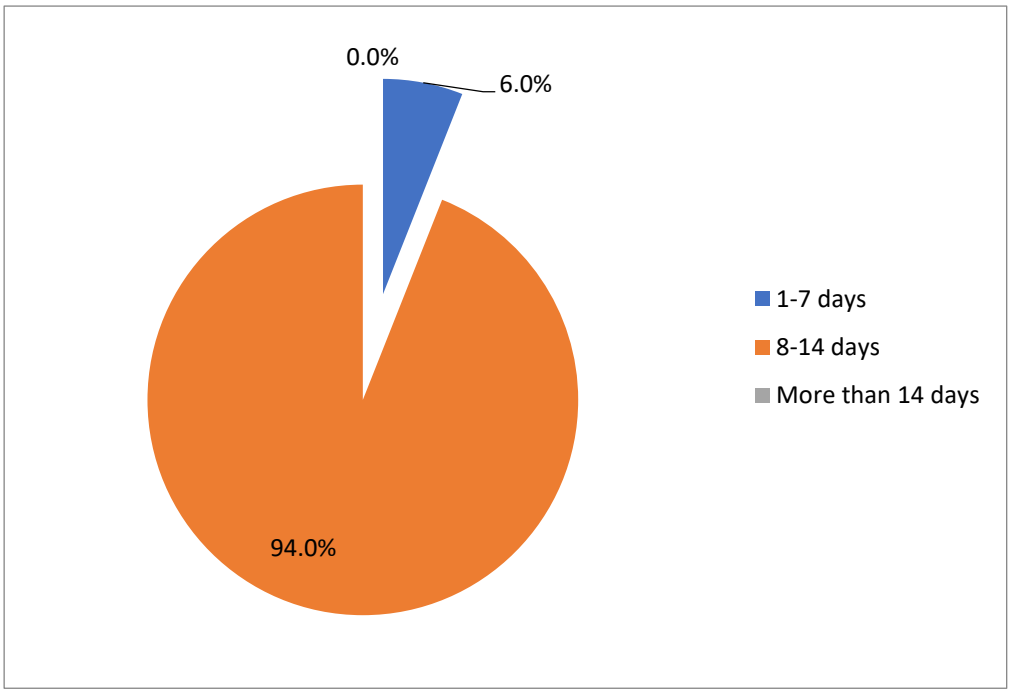

Figure 18:- Hospital stay time

EARLY POST-OP COMPLICATIONS

Seroma and surgical site infection were the early post-op complication noted in the patients. Seroma occurred in 8(16.0%) patients. 3 out of 10 (30%) were from the ACS group and the rest 5 (12.5%) were from the PCS group.

Table 9:- Seroma

Seroma	No. of cases	Percentage
NO	42	84.0%
YES	8	16.0%
Total	50	100.0%

Surgical site superficial infection occurred in 5(10.0%) of the patients. They had no relation with gender, co-morbid conditions, size, or site of the hernia. 2 (20%) patients were from the ACS group and the rest 3 (7.5%) were from the PCS group.

Table 10:- Infection

Infection	No. of cases	Percentage
NO	45	90.0%
YES	5	10.0%
Total	50	100%

Both complications were managed conservatively in all the patients with I/V antibiotics and regular dressings. None of the patients required surgical intervention.

However, no wound-related complications were noted in patients undergoing laparoscopic repair, that is eTEP TAR.

A dreaded complication of abdominal compartment syndrome was not encountered in the study.

DELAYED POST-OP COMPLICATIONS

OCCURRENCE OF PAIN ABDOMEN

None of the patients in the study complained of any pain apart from the pain at the local wound site. After discharge and on follow-up, none of the patients developed any significant pain.

RECURRENCE OF HERNIA

In the present study 2 patients, 1 following ACS (10%) and 1 following open TAR (2.5%) were found to have a recurrence of hernia during the follow-up period of 3 months as confirmed clinically and on ultrasound imaging of the abdomen. There was no correlation with diabetes, smoking/asthma, prostatism, or constipation.

INTERFERENCE WITH DAILY ACTIVITIES

During follow-up of three months after discharge, 8 (16%) patients reported mild interference in daily activities like defecation, weight-bearing or tying shoe-laces, etc.

DISCUSSION

Age and sex distribution

In our study, the mean age of the patients was 57.2 years (range being 40-72) years, with 22 (44%) out of 50 patients being above the age of 61 years. In the study of Appleton et al [48] the mean age of the patients was 62.5 years.

In our study gender distribution revealed more females 33(66.0%). However, variable reports of gender distribution are there in the literature.

In a study of Jaini gala[47], the mean age group was 53 years, with 23 males and 27 females.

In the series of Novitsky et al [44], gender distribution was reported to be 67% females of the total patients. In the series of Appleton et al, [48] 75% of the patients were males.

Body Mass Index

The mean BMI of the patients in our study was 29.8 kgs/sq meter body surface area. Most of the patients (47 out of 50) in our study were either overweight (BMI 25 to <30) or obese (BMI 30 to <35). Just 3 (6%) patients were in the normal weight range (BMI less than 25).

Jaini gala[47] also reported the mean BMI of 31.4 kegs/ sq meters in the ACS group and 29.5 in the TAR group.

Appleton et al [48] reported the mean BMI of the patients in their series to be 30.8-kegs/ sq meter body surface areas with the range being 19-34.4 kegs/ sq meters.

Thus the BMI of the patients in the present study was nearly similar to that of the above-mentioned studies.

Prevalence of Diabetes Mellitus

Diabetes has been a well-known factor for delaying the healing of any wound & thus proposed to be an important risk factor for incisional hernia development (Sugerman HJ et al [49]). In our study 18 (36.0%) out of the total of 50 patients were diabetic.

This finding is thus consistent with the findings of Sugerman HJ et al. [49]

Smoking status and Asthma

As smoking associated with chronic cough and also asthma have been proposed to be an important risk factor for incisional hernia development (Sorensen et al [50]). In our study, 4 patients had a history of asthma, and 2 were smokers, all having chronic cough consistent with the findings of Sorensen et al [50], though spirometry revealed no abnormality.

Constipation and Prostatism

In the present study, out of 50 patients, 16 (32.0 %) patients had chronic constipation. Constipation, through increasing the intra-abdominal pressure, is a factor for incisional hernia development/progression (Bucknail TE et al). [51]

In this study 5 out of 17 male patients had evidence of symptoms suggestive of prostatism.

History of previous abdominal surgery

17 (34 %) of our patients had a past history of laparotomy for intestinal perforation, while 10 (20%) patients had a history of previous hernia surgery.

In the study of Novitsky et al [44] recurrent ventral hernia was the most common indication for the repair of the abdominal wall (76.2%). Also, the study conducted by Appleton et al [47] had 5 out of 12 patients with a recurrent ventral hernia.

The reason likely might be an altogether different study population.

Symptoms urging the patients to go for surgical repair

The maximally prevalent symptoms among the patients wanting to get the current surgery for hernia repairs were cosmetic problems - patients (54%), discomfort in daily life-patients (76%), and chronic back pain-patients (30%).

In the study of Novitsky et al [44] 71.4% of patients had chronically incarcerated hernias.

Operation Time

In the present study, the mean operation time was 253.7 minutes, ranging from 90 minutes to 420 minutes.

Novitsky et al [44] reported that in their series the mean time taken for surgery was 235 minutes (range 138-400 minutes).

In the study of Samir et al[52], total operative time ranged from 130 to 210 min, with a mean of **140.45** ± 33.065 min. & their patients were managed with "component separation by the release of external oblique along with onlay mesh application"

In the study of Jaini Gala[47], the average operative time taken was 227 minutes in the ACS group and 276 minutes in the TAR group.

Hence, the average time in our study is comparable with the above studies.

Intra Operaitve complications

In our study, no major intraoperative complication was encountered and the average blood loss was 219.9 ml.

The findings are comparable to that of a study conducted by Jaini gala[47], which showed no major complication and an average blood loss of 189 ml and 225 ml in the ACS and TAR groups respectively.

Hospital stay time

Patients in this study were hospitalized for a mean period of 9.7 days. In the series of Novitsky et al [44] the mean hospital stay time was 5.1 days whereas in the series of Appleton et al [47] it was 7.5 days, both having a shorter stay as compared to this study.

The mean hospital stay in the series of Jaini Gala[47] was 13 days and 9 days in ACS and TAR groups respectively.

Short-term complications

Out of 50 patients in the study, 8 (16.0 %) patients developed a short-term complication in the form of seroma, 3 of 10 (30%) were from the ACS group and 5 of 40 (12.5%) were from the PCS group. The complication was managed conservatively in all patients with the removal of the sutures and the use of iv antibiotics.

5 (10.0 %) patients developed surgical site infection who were managed by iv antibiotics and regular dressings. 2 (20%) patients were from the ACS group and the rest 3 (7.5%) were from the PCS group.
There was no mesh-related infections.

Jaini Gala[47] reported 1 patient from the TAR group with seroma formation. Eight patients undergoing ACST (32%) and 7 patients (28%) undergoing TAR had wound-related complications. This difference was not statistically significant, however, five patients in the ACST group required surgical debridement, with one undergoing mesh explantation, whereas none of the patients in the TAR group required surgical intervention. Rest all were treated with I/V antibiotics and regular dressings.

Geffen et al[12] had reported that 58% of their patients had developed short-term complications, which, however, were of a type that required no intervention. Geffen et al[12] reported hematoma/ seroma formation in 23 out of 95 (24%) of the patients, while Samir et al[52] found the incidence of hematoma to be 6.3% and that of seroma to be 37.5%.

In the series of Geffen et al[12], superficial wound infection occurred in 24 (25%) patients.

Novitsky et al[44] had reported that 24%(10) of their patients had developed wound complications, of which 7 were minor superficial wound infections that responded to antibiotics alone and 3 were major complications requiring surgical debridement, all the patients had an uneventful recovery. Appleton et al [48] reported wound infection in one patient and seroma formation in another patient.

No wound-related complications were encountered in patients who underwent laparoscopic repair of ventral hernia. One of the reasons could be less number of cases performed.

Baig et al reported seroma formation in one patient which caused significant pain and discomfort for ten days post-op and hence had to be drained.[53]

Belyansky et al reported seroma formation in 3 patients and wound dehiscence in one case, no case of hematoma formation, surgical site

infection, or deep abscess was seen in their study. Retromuscular seroma was seen in 2 cases, of which one was managed conservatively but the other had to be drained by the percutaneous approach.[54]

Ko JH et al [55] tried to explain wide variations in the results of various workers. They have mentioned as under:

“One problem with outcome analyses after hernia repair is the lack of a common starting point for patients. In other words, midline hernias can be of various sizes, and patients differ in age, weight, tissue quality, wounds, and the need for concurrent bowel surgery. In addition, multicenter studies involving many patients introduce the added variables of the abilities and judgment of the surgeons. Because it is almost impossible to have the same starting point for all patients there are pre-existing intra series & inter-series variables.”

In our study, none of the patients developed “abdominal compartment syndrome”. This observation is similar to the one in the series of “Novitsky et al”[44], Appleton et al [48], Jaini gala[47], Geffen et al[12], Baig et al[53], Belyansky et al[54].

This finding is a very important point in the management of “Large Incisional Hernias” by different Component Separation Technique, which helps in restoring the “loss of abdominal domain”

COMPLICATIONS DURING FOLLOW UP AFTER DISCHARGE

Occurrence of pain abdomen

During the hospital stay as well as on follow-up for three months after discharge none of the patients developed any significant pain abdomen that could have been attributed to any complication of surgery.

Recurrence of hernia

2 patients (4 %), one following ACS and the other following TAR had a recurrence of hernia in our study as seen on physical examination and sonology. Whereas recurrence reported by other authors is 4.7 % by Novitsky et al [44] and 3.6% by Krpata et al [56].

Jaini Gala[47] in her study showed one recurrence in the ACS group only and there was no recurrence in the TAR group.

Samir et al[52] (2015) in their series of 16 patients with a large incisional hernia, managed with “component separation by the release of external oblique along with onlay mesh application” found no recurrence after a follow up of 12.2 months.

Sailes et al[57] (2010) reported a recurrence rate of 18.5% in their patients with a large incisional hernia, managed with “component separation by the release of external oblique along with onlay mesh application” and followed up over 10 years.

Hultman et al[58] (2011) reported a hernia recurrence rate of 19.8% at a mean follow-up of 4.4 years. Variation in the recurrence of hernia as seen in various studies is more likely due to variation in the duration of follow-up.

Interference with daily life activities

During follow-up of three months after discharge, 8 patients reported mild interference in daily activities like defecation, weight-bearing or tying shoe-laces, etc. However in general they were fully satisfied with the results of the surgery, and these minor problems could be handled easily with simple measures (like laxatives for constipation).

Geffen et al[12] and Appleton et al [48] also reported that their patients could perform daily life activities without limitations. Both concluded

that in their series, the application of mesh along with component separation did not create more limitations in daily life activities.

SUMMARY AND CONCLUSIONS

This study was conducted on 50 consenting patients with mid-line incisional “large ventral Hernia” with the size of ≥10cms at its maximum width. They were treated with different techniques including anterior and posterior component separation as well as laparoscopically and followed up for a period of 3 months.

The mean age of the patients was 57.2 years. There were more females as compared to males (66.0%, 33 out of 50 were females). The mean BMI of the patients in the study was 29.8-kg/sq meter body surface area. 18 (36.0 %) patients had a history of Type 2 Diabetes Mellitus. 4 patients had a history of Asthma and 2 patients gave a history of smoking though no evidence of COPD was observed on spirometry. 16 (32.0 %) patients had constipation and 5 patients of the 17 male patients had symptoms suggestive of prostatism. All the patients included in the study had large midline incisional hernia (with size > 10 cms. at its maximum width).

They were all surgically treated with a component separation technique. 10 patients underwent Anterior component separation with synthetic Onlay mesh, whereas, 40 patients underwent posterior component separation with mesh in the prefascial plane. Out of 40, 24(48.0%) patients underwent open TAR. In 4(8.0%) patients, eTEP TAR was done. The rest of the 12 (24.0%) cases underwent open RS procedure.

The mean operation time was 253.7 minutes. The mean hospital stay time was 9.7 day. Seroma occurred in 8(16.0%) patients. 3 out of 10 (30%) were from the ACS group and the rest 5 (12.5%) were from the PCS group.

Surgical site superficial infection occurred in 5(10.0%) of the patients

2 (20%) patients were from the ACS group and the rest 3 (7.5%) were from the PCS group.

There was no deep-seated or mesh infection.

Both complications were managed conservatively in all the patients with I/V antibiotics and regular dressings. None of the patients required

surgical intervention. However, no wound-related complications were noted in patients undergoing laparoscopic repair, that is eTEP TAR.

A dreaded complication of abdominal compartment syndrome was not encountered in the study.

Two (4.0%) patients, 1 from ACS group (10%) and 1 from PCS group-TAR (2.5%) developed recurrence of hernia during the follow-up of three months.

In this study, it is finally concluded that “Large ventral Hernias” can be effectively treated by using the “Component Separation Technique”. Also, we conclude that posterior component separation is a better and safer alternative because of lesser complications in the form of surgical site infections and recurrence rate.

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S. No.	NAME	MRD No.	Age (years)	Gender (M/F)	DoA	DoD	Present history								Past History					
							Swelling		Pain abdomen	Distention	Constipation	Vomitting	Chronic back pain	Discomfort	Date of lap and reason	Diabetes	Cough/ COPD	Connective tissue disease	Prostatism	Malignancy
							Size (cm)	Reducibility												
1	AR	724011	62	F	9/2/2019	9/12/2019	10x8	YES	7	NO	NO	NO	5	9	LSCS 15 years and 20 years back	NO	NO	NO	NO	NO
2	RJ	871197	50	M	9/3/2019	9/11/2019	11x8	YES	3	YES	YES	NO	5	6	Ventral hernia repair 8 years and 5 years back	NO	NO	NO	YES	NO
3	RK	637675	65	M	9/22/2019	10/1/2019	12x17	YES	4	NO	YES	NO	6	8	perforation 20 years back, hernia repair 10 years and 7 years back	NO	NO	NO	YES	NO
4	BK	908636	56	F	10/30/2019	11/8/2019	10x7	YES	1	NO	YES	NO	1	3	ventral hernia 6 years back	NO	NO	NO	NO	NO
5	AS	798648	46	M	11/4/2019	11/15/2019	10x6	YES	5	NO	NO	NO	4	6	perforation peritonitis, stoma closure 3 years ago	NO	NO	NO	NO	NO
6	SC	913998	58	F	11/10/2019	11/17/2019	12x4	YES	3	NO	NO	NO	3	4	LSCS 30 years and hernia repair 10 years back	NO	NO	NO	NO	NO
7	AG	986938	52	F	11/13/2019	11/19/2019	12x10	YES	5	YES	YES	NO	2	5	obstruction due to ileal striicture 5 years ago	NO	NO	NO	NO	NO
8	SD	931325	50	F	11/14/2019	11/20/2019	11x9	YES	5	YES	YES	NO	4	8	ventral hernia 5 years back	NO	NO	NO	NO	NO
9	JS	729406	71	M	11/25/2019	12/2/2019	10X 7 , 7 x 5	YES	4	NO	YES	NO	4	6	laparotomy for gunshot15 years back and ventral hernia repair 10 years back	YES	NO	NO	YES	NO
10	PK	901357	63	F	12/3/2019	12/10/2019	12x10	YES	6	YES	NO	NO	2	7	perforation peritonitis, stoma closure 7 years ago	YES	NO	NO	NO	NO
11	BK	973562	58	F	12/10/2019	12/20/2019	13x8	YES	2	NO	NO	NO	6	3	LSCS 30 AND 35 YEARS BACK	NO	NO	NO	NO	NO
12	AK	888654	63	M	12/22/2019	12/30/2019	12X8	YES	1	YES	NO	NO	3	6	open chole 5 years back	NO	NO	NO	YES	NO
13	RK	745671	55	F	1/3/2020	1/9/2020	13X7	YES	7	NO	NO	NO	6	8	LSCSx26y;lap cholex2y	NO	NO	NO	NO	NO
14	TJ	818098	28	M	1/14/2020	1/26/2020	10x10	YES	1	NO	NO	NO	4	5	perforation peritonitis x 4 years	NO	NO	NO	NO	NO
15	SR	740832	61	F	1/30/2020	2/5/2020	12X10	YES	5	YES	NO	NO	2	6	open chole 6 years back	NO	NO	NO	NO	NO
16	GK	690832	68	F	2/6/2020	14--02-2020	10x9	YES	6	YES	YES	NO	2	7	CABG - 16 years back	YES	NO	NO	NO	NO
17	BS	991764	63	M	2/10/2020	2/20/2020	10 x 5	YES	2	NO	NO	NO	3	6	laparotomy and stoma closure 15 years ago	YES	NO	NO	NO	NO
18	AK	990445	77	F	2/27/2020	3/6/2020	12x11	YES	7	NO	NO	NO	1	4	ventral henria repair 10 years back	YES	NO	NO	NO	NO
19	RK	618540	43	M	3/7/2020	3/14/2020	10x10	YES	1	NO	NO	NO	2	2	perforation peritonitis x 4 years	NO	NO	NO	NO	NO
20	KJ	597331	65	F	3/20/2020	3/29/2020	12X6	YES	7	NO	NO	NO	1	7	20 yrs back umbilical hernia repair	YES	NO	NO	NO	NO
21	NK	991062	68	M	3/25/2020	4/4/2020	13x10	YES	3	NO	NO	NO	2	1	ventral hernia repair 5 years ago	YES	NO	NO	NO	NO
22	KG	583220	50	F	3/30/2020	4/6/2020	11x9	YES	1	NO	NO	NO	7	4	hystrectomy 3 years back	YES	NO	NO	NO	NO

S. No.	NAME	MRD No.		GPE								systemic exam\									
			Chemotherapy / radiotherpay	Pulse	BP (mmHg)	Respiratory Rate	Temp (^{o}F)	Height (cm)	Weight (kg)	BMI	Waist (cm)	Chest	CVS	CNS	Site	Distention	Tenderness	Abdominal girth (cm)	Max. width (cm)	Area (sqcm)	Reducibility
1	AR	724011	NO	100	140/80	20	98	160	85	30	120	NAD	NAD	NAD	lower abdomen	mild	NO	118	10	100	YES
2	RJ	871197	NO	88	120/80	18	98	170	80	26	100	NAD	NAD	NAD	umbilical	NO	NO	110	12	144	YES
3	RK	637675	NO	90	110/80	14	98	163	72	27	114	NAD	NAD	NAD	midline	NO	NO	114	17	289	YES
4	BK	908636	NO	80	110/70	14	98	160	75	29	118	NAD	NAD	NAD	epigastric and umbilical	NO	NO	120	10	100	YES
5	AS	798648	NO	86	120/80	18	98	158	77	31	120	NAD	NAD	NAD	mid abdomen	NO	NO	120	15	225	YES
6	SC	913998	NO	88	130/90	14	98	166	93	34	118	NAD	NAD	NAD	infraumbilical	NO	NO	120	11	121	YES
7	AG	986938	NO	72	130/80	14	98	155	65	27	118	NAD	NAD	NAD	umbilical	mild	NO	130	15	225	YES
8	SD	931325	NO	94	130/80	16	98	160	75	29	118	NAD	NAD	NAD	periumbilical	mild	NO	120	10	100	YES
9	JS	729406	NO	86	130/80	16	98	164	65	24	95	NAD	NAD	NAD	supraumbilical and infraumbilical	NO	NO	98	12	144	YES
10	PK	901357	NO	72	110/70	14	98	155	67	28	101	NAD	NAD	NAD	mid abdomen	NO	NO	130	12	144	YES
11	BK	973562	NO	72	110/60	20	98	160	82	32	114	NAD	NAD	t facial pals	infra umbilical	NO	NO	115	14	480	YES
12	AK	888654	NO	96	130/70	14	98	168	63	22	88	NAD	NAD	NAD	perumbilical	NO	NO	110	12	144	YES
13	RK	745671	NO	86	120/80	16	98	158	77	31	120	NAD	NAD	NAD	upper abdomen	NO	NO	120	11	121	YES
14	TJ	818098	NO	88	130/80	14	98	165	80	30	110	crepts	NAD	NAD	periumbilical	NO	NO	112	10	100	YES
15	SR	740832	NO	72	130/80	12	98	155	65	27	118	NAD	NAD	NAD	periumbilical	NO	NO	130	12	144	YES
16	GK	690832	NO	72	110/70	12	98	155	67	28	101	NAD	NAD	NAD	epigastric	NO	NO	100	10	100	YES
17	BS	991764	NO	74	110/70	20	98	160	78	30	110	NAD	NAD	NAD	midline	mild	NO	114	20	400	YES
18	AK	990445	NO	78	110/70	18	98	160	72	28	110	NAD	NAD	NAD	umbilical	mild	NO	120	12	144	YES
19	RK	618540	NO	88	130/80	18	98	165	80	30	110	NAD	NAD	NAD	periumbilical	NO	NO	112	10	100	YES
20	KJ	597331	NO	78	110/70	16	98	160	72	28	110	NAD	NAD	NAD	umbilical	mild	NO	105	12	144	YES
21	NK	991062	NO	76	120/80	16	98	160	80	31	100	NAD	NAD	NAD	midline	NO	NO	110	13	169	YES
22	KG	583220	NO	74	110/70	16	98	160	78	30	110	crepts	NAD	NAD	paraumbilical	NO	NO	114	11	121	YES

S. No.	NAME	MRD No.					intra op													
			Overlying skin	Bowel sounds	Imaging study	Other invest	Steps	Mesh	Midline approx	blood loss (in mL)	Duration of surgery (min)	orally started (POD)	Hematoma	Seroma	Infection	Drain removal on day	Duration of stay (days)	Pain abdomen	Recurrence
1	AR	724011	Normal	Normal	CECT- 10.2x 8 cm defec, no obst	-	OPEN TAR	30x30cm, PREFASCIAL	YES	250	295	2	NO	NO	NO	5	9	1	NO
2	RJ	871197	Normal	Normal	CECT Abd- 10.8 x 6.1cm wall defect, no obst	-	OPEN RS	30x30cm, PREFASCIAL	YES	200	285	1	NO	YES	NO	4	9	1	NO
3	RK	637675	Normal	Normal	CECT Abd- 17.1 x 12.1cm wall defect, no obst	ECHO-N	OPEN TAR	30x30cm, PREFASCIAL	YES	350	330	3	NO	NO	NO	6	9	2	NO
4	BK	908636	Normal	Normal	CECT Abd- 10.7 x 7.8cm wall defect, no obst	-	ACS	15X15 cm, ONLAY	YES	100	180	1	NO	NO	NO	6	6	2	NO
5	AS	798648	Normal	Normal	CECT Abd- 10cm wall defect, no obst	ECHO-N	OPEN RS	30x30cm, PREFASCIAL	YES	250	255	4	NO	NO	YES	5	10	1	NO
6	SC	913998	Normal	Normal	CECT Abd- 10.3 x 5.8cm wall defect infraumbilical, no obst	-	OPEN TAR	30x30cm, PREFASCIAL	YES	400	225	3	NO	NO	NO	3	8	2	NO
7	AG	986938	Normal	Normal	CECT- 10.6x 9 cm defec, no obst	ECHO-N	OPEN RS	30x30cm, PREFASCIAL	YES	150	285	2	NO	YES	NO	3	9	1	NO
8	SD	931325	Normal	Normal	CECT Abd- 10.7 x 7.8cm wall defect, no obst	-	OPEN TAR	30x30cm, PREFASCIAL	YES	300	330	2	NO	NO	NO	5	11	1	NO
9	JS	729406	Normal	Normal	CECT- 2 defects one 10 x 7 cm supraumbilical and one 5 X 7 cm infraumbilical	ECHO-N	ACS	15X15 cm, ONLAY	YES	50	120	1	NO	YES	YES	8	8	1	NO
10	PK	901357	Normal	Normal	CECT- 11.5x 11 cm defec, no obst, muscles thinned	ECHO-N	OPEN RS	30x30cm, PREFASCIAL	YES	100	275	5	NO	NO	NO	4	13	2	NO
11	BK	973562	Normal	Normal	CECT Abd- 14.2 x 8.1cm wall defect, no obst	ECHO-N	OPEN TAR	30x30cm, PREFASCIAL	YES	450	360	4	NO	NO	NO	4	8	2	NO
12	AK	888654	Normal	Normal	CECT Abd-11 x 9 cm defect right upper quadrant, transverse colon and liver content	-	OPEN TAR	30x30cm, PREFASCIAL	YES	350	300	6	NO	NO	NO	3	11	1	NO
13	RK	745671	Normal	Normal	CECT Abd- 13.2x 7 cm defect, no obst.	-	OPEN TAR	30x30cm, PREFASCIAL	YES	200	240	2	NO	NO	NO	4	10	1	NO
14	TJ	818098	Normal	Normal	CECT- 10.1x 10.2 cm defect, no obst	-	OPEN RS	30x30cm, PREFASCIAL	YES	125	225	3	NO	NO	NO	5	13	1	NO
15	SR	740832	Normal	Normal	CECT Abd- 12 x 10.3 cm wall defect, no obst.	-	ACS	15X15 cm, ONLAY	YES	75	120	1	NO	NO	NO	7	8	1	YES
16	GK	690832	Normal	Normal	CECT Abd- 10 x 9.7 cm wall cm defect, no obst.	ECHO-N	OPEN TAR	30x30cm, PREFASCIAL	YES	225	330	2	NO	NO	NO	5	9	1	NO
17	BS	991764	Normal	Normal	CECT- 2 defects one 10 x 7 cm and one 5 x 4 cm stoma site	ECHO - LVH,mildAR	OPEN RS	30x30cm, PREFASCIAL	YES	175	255	3	NO	NO	NO	3	10	2	NO
18	AK	990445	Normal	Normal	CECT- 2 defects one 12 x 9 cm and one 3 x 1 cm	ECHO-N	OPEN RS	30x30cm, PREFASCIAL	YES	100	220	2	NO	NO	NO	4	11	1	NO
19	RK	618540	Normal	Normal	CECT Abd- 10.5 x 10 cm wall cm defect, no obst, normal muscles	-	OPEN TAR	30x30cm, PREFASCIAL	YES	325	200	4	NO	NO	NO	3	8	2	NO
20	KJ	597331	Normal	Normal	CECT Abd- 12.2 x 6.8 cm defect, no obst.	ECHO-N	OPEN TAR	30x30cm, PREFASCIAL	YES	175	255	3	NO	NO	NO	5	10	2	NO
21	NK	991062	Normal	Normal	CECT- 13.6x 10.2 cm defect, no obst	-	OPEN TAR	30x30cm, PREFASCIAL	YES	225	240	5	NO	YES	NO	7	11	1	NO
22	KG	583220	Normal	Normal	CECT Abd- 11.3 x 9.1 cm defect, no obst.	ECHO-N	OPEN TAR	30x30cm, PREFASCIAL	YES	275	300	7	NO	NO	YES	6	13	1	NO

S. No.	NAME	MRD No.	Age (years)	Gender (M/F)	DoA	DoD	Present history								Past History					
							Swelling		Pain abdomen	Distention	Constipation	Vomitting	Chronic back pain	Discomfort	Date of lap and reason	Diabetes	Cough/ COPD	Connective tissue disease	Prostatism	Malignancy
							Size (cm)	Reducibility												
23	SK	804523	62	F	4/8/2020	4/15/2020	11x8	YES	3	NO	NO	NO	1	1	hystrectomy- 10y	NO	NO	NO	NO	NO
24	RP	319205	55	M	4/8/2020	4/18/2020	11x12	YES	2	NO	NO	NO	4	6	ventral hernia repair 8 years ago and recurrent hernia repair 5 years ago	NO	NO	NO	NO	NO
25	V	950373	65	F	4/9/2020	4/19/2020	8x10	YES	8	NO	NO	NO	4	7	TAH ć BSO x12y; hernia repair 9y	NO	ASTHMA	NO	NO	NO
26	BK	888343	47	F	4/28/2020	5/4/2020	17X9	YES	1	NO	NO	NO	2	5	hystrectomy 1yr back	NO	NO	NO	NO	NO
27	SK	786540	53	F	10-Nov	11/17/2020	10x10	YES	3	NO	NO	NO	1	6	Intestinal TB, perforation, laparotomy 5 yrs	YES	NO	NO	NO	NO
28	J	898763	48	F	11/18/2020	11/26/2020	10x8	YES	7	NO	NO	NO	5	9	LSCS 20 years back	YES	NO	NO	NO	NO
29	SM	853981	69	F	11/24/2020	12/3/2020	12x5	YES	2	NO	NO	NO	1	4	Recurrent hernia; perforation	NO	SMOKER	NO	NO	NO
30	GS	824223	73	M	12/3/2020	12/11/2020	10X5	YES	1	NO	NO	NO	2	5	laparotomy for gunshot 8 years back	YES	NO	NO	NO	NO
31	MK	845111	45	F	12/14/2020	12/25/2020	10x10	YES	3	NO	NO	NO	3	6	perforation peritonitis 10 years back, ventral hernia 8 years	NO	NO	NO	NO	NO
32	BK	357460	59	F	12/16/2020	12/23/2020	12x8, 5x3	YES	4	NO	YES	NO	5	6	perforation peritonitis, stoma closure 5 years ago	YES	NO	NO	NO	NO
33	TR	866155	57	F	12/25/2020	1/2/2021	18x8	YES	3	YES	NO	NO	5	7	lscs 31 years back	NO	ASTHMA	NO	NO	NO
34	MG	1007320	54	F	1/1/2021	1/9/2021	12X3	YES	4	NO	NO	NO	4	6	hystrectomy- 5y	NO	NO	NO	NO	NO
35	RK	941210	68	F	1/5/2021	1/13/2021	10x12	YES	7	YES	YES	NO	2	8	perforation peritonitis x 3 years	NO	NO	NO	NO	NO
36	RR	878423	40	F	1/7/2021	1/15/2021	13x10	YES	5	YES	YES	NO	4	8	Open chole x 8 yrs	YES	ASTHMA	NO	NO	NO
37	MK	932187	53	F	1/20/2021	1/29/2021	13x8	YES	4	NO	YES	NO	1	6	TAH ć BSO nov 5 years back	NO	ASTHMA	NO	NO	NO
38	RK	858651	53	F	1/30/2021	2/8/2021	12x10	YES	3	NO	NO	NO	2	7	Hystrectomy x 10yrs back	NO	NO	NO	NO	NO
39	AL	465587	65	M	2/2/2021	2/13/2021	11x7	YES	2	NO	YES	NO	7	5	traumatic perforation 7 years ago	NO	SMOKER	NO	NO	NO
40	GS	695621	54	M	2/10/2021	2/18/2021	10 x 5	YES	3	NO	YES	NO	4	6	perforation due to gunshot injury	NO	NO	NO	NO	NO
41	RT	1024654	35	F	2/21/2021	2/28/2021	12x8	YES	2	YES	YES	NO	5	4	TAH BSO 7 years back	NO	NO	NO	NO	NO
42	RK	941236	67	F	2/26/2021	3/4/2021	11x9	YES	2	NO	NO	NO	1	3	intestinal perforation 5 years back	NO	NO	NO	NO	NO
43	KD	912442	62	F	3/7/2021	3/16/2021	12x11	YES	3	NO	NO	NO	2	4	ventral hernia repair 5 years back	NO	NO	NO	NO	NO
44	M	1029126	74	M	3/16/2021	3/24/2021	10x8	YES	5	NO	NO	NO	4	1	ventral hernia repair 7 years ago	YES	NO	NO	NO	NO
45	KK	705880	41	F	3/20/2021	3/30/2021	12x10	YES	6	YES	NO	NO	2	7	perforation peritonitis, stoma closure 7 years ago	NO	NO	NO	NO	NO

S. No.	NAME	MRD No.		GPE								systemic exam\									
			Chemotherapy / radiotherpay	Pulse	BP (mmHg)	Respiratory Rate	Temp (^{o}F)	Height (cm)	Weight (kg)	BMI	Waist (cm)	Chest	CVS	CNS	Site	Distention	Tenderness	Abdominal girth (cm)	Max. width (cm)	Area (sqcm)	Reducibility
23	SK	804523	NO	76	120/80	20	98	160	64	25	95	NAD	NAD	NAD	periumbilical	NO	NO	110	10	100	YES
24	RP	319205	NO	84	130/80	14	98	163	84	32	115	NAD	NAD	NAD	midline	NO	NO	120	12	144	YES
25	V	950373	NO	70	110/70	20	98	163	78	29	108	NAD	NAD	NAD	supraumbilical	NO	NO	110	10	100	YES
26	BK	888343	NO	88	110/70	14	98	160	85	34	104	NAD	NAD	NAD	infraumbilical	NO	NO	104	17	289	YES
27	SK	786540	NO	72	110/70	12	98	158	66	27	120	NAD	NAD	NAD	periumbilical	NO	NO	132	10	100	YES
28	J	898763	NO	100	150/90	16	98	160	85	30	120	NAD	NAD	NAD	lower abdomen	NO	NO	118	10	100	YES
29	SM	853981	NO	90	110/80	16	98	163	80	30	114	crepts	NAD	NAD	periumbilical	NO	NO	114	12	144	YES
30	GS	824223	NO	80	110/70	18	98	165	87	33	118	NAD	NAD	NAD	Supraumbilical	NO	NO	120	10	100	YES
31	MK	845111	NO	114	130/90	20	98	163	93	35	118	NAD	NAD	NAD	infraumbilical	NO	NO	120	10	100	YES
32	BK	357460	NO	86	130/80	18	98	160	80	31	104	NAD	NAD	NAD	midine, stomal site	NO	NO	110	11	121	YES
33	TR	866155	NO	90	120/80	12	98	170	106	37	145	NAD	NAD	NAD	hypogastrium	NO	NO	145	18	324	YES
34	MG	1007320	NO	88	100/70	14	98	160	85	34	110	NAD	NAD	NAD	infraumbilical	NO	NO	104	12	144	YES
35	RK	941210	NO	108	190/100	14	98	158	70	28	100	crepts	NAD	NAD	infraumbilical	NO	NO	110	12	144	YES
36	RR	878423	NO	94	130/80	14	98	158	75	30	118	NAD	NAD	NAD	periumbilical	mod	NO	120	13	169	YES
37	MK	932187	NO	86	130/80	16	98	164	65	24	95	NAD	NAD	NAD	supraumbilical	NO	NO	98	13	169	YES
38	RK	858651	NO	78	110/80	18	98	160	85	34	110	NAD	NAD	NAD	infraumbilical	NO	NO	104	12	144	YES
39	AL	465587	NO	70	110/70	16	98	165	72	27	108	basal rho	NAD	NAD	midline	NO	NO	110	16	256	YES
40	GS	695621	NO	72	110/70	20	98	170	78	27	100	NAD	NAD	NAD	midine, stomal site	NO	NO	122	10	100	YES
41	RT	1024654	NO	90	110/80	16	98	163	80	30	114	crepts	NAD	NAD	lower abdomen	NO	NO	114	12	144	YES
42	RK	941236	NO	72	110/60	18	98	160	82	32	114	NAD	NAD	NAD	infra umbilical	NO	NO	115	11	121	YES
43	KD	912442	NO	86	120/80	14	98	164	88	33	108	NAD	NAD	NAD	infra umbilical	NO	NO	110	12	144	YES
44	M	1029126	NO	88	120/80	16	98	160	80	31	100	NAD	NAD	NAD	midline	NO	NO	110	10	100	YES
45	KK	705880	NO	72	110/70	14	98	155	67	28	101	NAD	NAD	NAD	mid abdomen	NO	NO	130	12	144	YES

S. No.	NAME	MRD No.					intra op													
			Overlying skin	Bowel sounds	Imaging study	Other invest	Steps	Mesh	Midline approx	blood loss (in mL)	Duration of surgery (min)	orally started (POD)	Hematoma	Seroma	Infection	Drain removal on day	Duration of stay (days)	Pain abdomen	Recurrence
23	SK	804523	Normal	Normal	CECT Abd- 10.3x8.1 cm defect, no obst.	-	ACS	15X15 cm, ONLAY	YES	25	90	2	NO	NO	NO	7	8	1	NO
24	RP	319205	Normal	Normal	CECT Abd- 12.5 x 11.1cm wall defect, no obst	-	OPEN RS	30x30cm, PREFASCIAL	YES	175	270	4	NO	NO	NO	2	11	2	NO
25	V	950373	Normal	Normal	CECT Abd- 10.2x 7 cm defect, no obst.	SPIROMETRY-WNL	ACS	15X15 cm, ONLAY	YES	150	180	2	NO	YES	NO	10	11	2	NO
26	BK	888343	Normal	Normal	CECT Abd- 17.2 x 7.5 cm defect, no obst.	-	OPEN TAR	30x30cm, PREFASCIAL	YES	375	285	2	NO	YES	NO	4	8	2	NO
27	SK	786540	Normal	Normal	CECT Abd- 10.3 x 10 cm defect, no obst.	ECHO-N	eTEP TAR	30x30 cm, PREFASCIAL	YES	225	420	1	NO	NO	NO	3	5	1	NO
28	J	898763	Normal	Normal	CECT Abd- 10 x 8.1 cm defect, no obst.	ECHO-N	OPEN TAR	30x30cm, PREFASCIAL	YES	275	225	3	NO	NO	NO	5	9	2	NO
29	SM	853981	Normal	Normal	CECT Abd- 12.4 x 5.5 cm defect, no obst.	SPIROMETRY-WNL	OPEN TAR	30x30cm, PREFASCIAL	YES	325	300	2	NO	NO	NO	5	10	1	NO
30	GS	824223	Normal	Normal	CECT Abd- 10.2x 5.8cm defect, no obst.	ECHO-N	ACS	15X15 cm, ONLAY	YES	125	140	2	NO	NO	NO	8	9	1	NO
31	MK	845111	Normal	Normal	CECT Abd- 10.1 x 10 cm defect, no obst.,normal muscles	-	OPEN TAR	30x30cm, PREFASCIAL	YES	250	290	5	NO	NO	YES	5	12	2	NO
32	BK	357460	Normal	Normal	CECT- 2 defects one 11.5 x 8 cm and one 7 x 6 cm stoma site	-	OPEN RS	30x30cm, PREFASCIAL	YES	200	220	3	NO	NO	NO	2	11	1	NO
33	TR	866155	Normal	Normal	CECT Abd- 18 x8.4 cm defect, no obst.	SPIROMETRY-WNL	OPEN TAR	30x30cm, PREFASCIAL	YES	400	270	1	NO	NO	NO	5	9	2	NO
34	MG	1007320	Normal	Normal	CECT Abd- 11.2 x 7.5 cm defect, no obst.	-	eTEP TAR	30x30cm, PREFASCIAL	YES	225	385	2	NO	NO	NO	3	6	2	NO
35	RK	941210	Normal	Normal	CECT Abd- 12 x 10.3 cm defect, no obst.	-	OPEN TAR	30x30cm, PREFASCIAL	YES	300	240	2	NO	NO	NO	4	9	1	NO
36	RR	878423	Normal	Normal	CECT Abd- 13.2 x 10 cm defect, no obst.	ECHO-N, SPIROMETRY-WNL	OPEN TAR	30x30cm, PREFASCIAL	YES	175	270	3	NO	NO	NO	5	9	3	NO
37	MK	932187	Normal	Normal	CECT Abd- 13 x 8 cm defect, no obst.	SPIROMETRY-WNL	OPEN TAR	30x30cm, PREFASCIAL	YES	425	280	2	NO	NO	NO	4	10	2	NO
38	RK	858651	Normal	Normal	CECT Abd- 11.5 x 9.5 cm defect, no obst.		eTEP TAR	30x30cm, PREFASCIAL	YES	220	350	1	NO	NO	NO	2	8	2	NO
39	AL	465587	Normal	Normal	CECT Abd- 11.3 x 8.6cm wall defect, no obst	SPIROMETRY-WNL	OPEN RS	30x30cm, PREFASCIAL	YES	150	210	4	NO	NO	NO	4	11	2	NO
40	GS	695621	Normal	Normal	CECT- 2 defects one 11 x 7 cm and one 7 x 4 cm stoma site	ECHO-N	OPEN RS	30x30cm, PREFASCIAL	YES	200	270	2	NO	YES	NO	6	10	2	NO
41	RT	1024654	Normal	Normal	CECT Abd- 12.4 x 5.5 cm defect, no obst.	-	ACS	15X15 cm, ONLAY	YES	150	200	1	NO	NO	NO	7	10	1	NO
42	RK	941236	Normal	Normal	CECT Abd- 11.1 x 9 cm defect, no obst.	-	ACS	15X15 cm, ONLAY	YES	100	170	2	NO	NO	YES	4	8	1	NO
43	KD	912442	Normal	Normal	CECT Abd- 12 x 11 cm defect, no obst.	-	OPEN TAR	30x30cm, PREFASCIAL	YES	350	285	3	NO	NO	NO	6	10	1	NO
44	M	1029126	Normal	Normal	CECT- 13.6x 10.2 cm defect, no obst	-	eTEP TAR	30x30cm, PREFASCIAL	YES	100	400	1	NO	NO	NO	4	8	1	NO
45	KK	705880	Normal	Normal	CECT- 11.5x 11 cm defec, no obst, muscles thinned	ECHO-N	OPEN TAR	30x30cm, PREFASCIAL	YES	225	240	4	NO	NO	NO	5	13	2	YES

S. No.	NAME	MRD No.	Age (years)	Gender (M/F)	DoA	DoD	Present history								Past History					
							Swelling		Pain abdomen	Distention	Constipation	Vomitting	Chronic back pain	Discomfort	Date of lap and reason	Diabetes	Cough/ COPD	Connective tissue disease	Prostatism	Malignancy
							Size (cm)	Reducibility												
46	AS	765428	56	M	3/29/2021	4/5/2021	11x11	YES	5	NO	YES	NO	1	3	ventral hernia repair 7 years ago	YES	NO	NO	NO	NO
47	SB	1004983	65	F	4/3/2021	4/12/2021	13x12	YES	4	NO	NO	NO	1	4	intestinal obstruction 3 years back	YES	NO	NO	NO	NO
48	FB	950630	67	M	4/10/2021	4/20/2021	10x9, 5x3	YES	6	YES	YES	NO	6	5	perforation peritonitis, stoma closure 6 years ago	YES	NO	NO	NO	NO
49	TK	846584	45	F	4/15/2021	4/22/2021	11x8	YES	3	NO	NO	NO	4	3	TAH BSO 3 years back	NO	NO	NO	NO	NO
50	MS	824216	70	M	4/23/2021	5/2/2021	10x7	YES	1	NO	NO	NO	1	5	CABG - 15 years back	YES	NO	NO	YES	NO

S. No.	NAME	MRD No.		GPE								systemic exam\									
			Chemotherapy / radiotherpay	Pulse	BP (mmHg)	Respiratory Rate	Temp (^{o}F)	Height (cm)	Weight (kg)	BMI	Waist (cm)	Chest	CVS	CNS	Site	Distention	Tenderness	Abdominal girth (cm)	Max. width (cm)	Area (sqcm)	Reducibility
46	AS	765428	NO	84	130/80	12	98	170	86	30	110	NAD	NAD	NAD	supraumbilical and infraumbilical	NO	NO	114	11	121	YES
47	SB	1004983	NO	86	110/90	18	98	164	88	33	108	NAD	NAD	NAD	supra umbilical	NO	NO	110	13	169	YES
48	FB	950630	NO	78	150/90	16	98	174	98	32	118	NAD	NAD	NAD	midline and stoma site	mild	NO	120	15	225	YES
49	TK	846584	NO	88	110/70	18	98	155	67	28	101	NAD	NAD	NAD	midline	NO	NO	118	12	144	YES
50	MS	824216	NO	80	110/70	18	98	165	87	33	118	NAD	NAD	NAD	epigastric	NO	NO	120	10	100	YES

S. No.	NAME	MRD No.					intra op					orally started								
			Overlying skin	Bowel sounds	Imaging study	Other invest	Steps	Mesh	Midline approx	blood loss (in mL)	Duration of surgery (min)	(POD)	Hematoma	Seroma	Infection	Drain removal on day	Duration of stay (days)	Pain abdomen	Recurrence
46	AS	765428	Normal	Normal	CECT Abd- 11.2 x 11 cm defect, no obst.	-	ACS	15X15 cm, ONLAY	YES	75	110	2	NO	YES	NO	8	10	1	NO
47	SB	1004983	Normal	Normal	CECT Abd- 12.4 x 10.6 cm defect, no obst.	-	OPEN RS	30x30cm, PREFASCIAL	YES	275	275	2	NO	NO	NO	5	10	1	NO
48	FB	950630	Normal	Normal	CECT Abd- 10.3 x 9 cm defect and 1 defect 5 x 3 cm parastomal	ECHO-N	OPEN TAR	30x30cm, PREFASCIAL	YES	325	290	3	NO	NO	NO	10	11	2	NO
49	TK	846584	Normal	Normal	CECT Abd- 10.3 x 9 cm defect	ECHO-N	ACS	15X15 cm, ONLAY	YES	125	140	2	NO	NO	NO	6	11	2	NO
50	MS	824216	Normal	Normal	CECT Abd- 10.6x 7 cm defect, no obst.	ECHO-N	OPEN TAR	30x30cm, PREFASCIAL	YES	200	255	3	NO	NO	NO	4	9	1	NO

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No. BFUHS/2K21p-TH/ 5053 Date 20/4/2021

The Principal,
DMC Ludhiana.

Subject: **Approval of Plan of Thesis.**

This is to inform you that the Faculty of Medical Sciences in its meeting held on 22.01.2021 has approved the plan of thesis of **Dr. Harshit Gupta,** a student of your college for **MS General Surgery** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis
Evaluation of the clinical outcome following large ventral hernia repair

Supervisor
Dr. Sanjeev K. Singla
Prof.,
Dept. of Surgery,
DMCH, Ludhiana.

Co-Supervisor
Dr. Jaspal Singh
Prof. & Head,
Dept. of Surgery,
DMCH, Ludhiana.

The student has to submit the three copies of thesis (along with PDF format) , to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She must directed to attach a photocopy of this letter with the forwarding letter while submitting thesis to the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic,(if any).

Dr. S P Singh MS(Oph)
Controller of Examinations

Note :

1. ***If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.***
2. *The student may submit the thesis as per the schedule already conveyed i.e for May/June examination 30th Nov of the preceding the year of examination and for Nov/Dec examinations 31st May of the year of examination.*

EVALUATION OF THE CLINICAL OUTCOME FOLLOWING LARGE VENTRAL HERNIA REPAIR

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED

IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

M.S.

in

Surgery

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES
FARIDKOT

NOVEMBER, 2019

DR HARSHIT GUPTA

DEPARTMENT OF SURGERY
DAYANAND MEDICAL COLLEGE AND HOSPITAL
LUDHIANA

ABSTRACT OF PLAN OF THESIS

Title	EVALUATION OF THE CLINICAL OUTCOME FOLLOWING LARGE VENTRAL HERNIA REPAIR
For the degree of	M.S. General Surgery
Name of the candidate	Dr Harshit Gupta
Supervisor	Dr. Sanjeev K Singla, Professor, Department of Surgery, DMCH, Ludhiana
Co-supervisor	Dr. Jaspal Singh, Professor & Head, Department of Surgery, DMCH, Ludhiana
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Introduction: A ventral hernia is defined as a protrusion of intra abdominal contents through the defect present in anterior abdominal wall fascia. Depending upon the size of defect, the approach can either be Open or Laparoscopic.

Aim of Study: This study aims to document the various post operative outcomes of the patients presenting with LARGE VENTRAL HERNIA in the given time period- in terms of approach, length of stay, wound infection, recurrence and overall mortality..

Methods: Information will be collected via predesigned proforma, complete clinical examination will be done and USG/CT SCAN reports will be analysed in this time bound study. (Extending from december 2019 to june 2021). All patients with LARGE VENTRAL HERNIA, diagnosed clinically, requiring treatment in the form of LAPAROSCOPIC or OPEN APPROACH will be included.

Clinical Significance: Significance of this study is that correlating the approach used for repair along with rate of recurrence and overall morbidity in all the patients presenting with large ventral hernia.

Keywords: Ventral hernia, Elective surgery, Open repair, Laparoscopy, Post operative outcomes.

(Signature)	(Signature)	(Signature)	(Signature)
Candidate	Co-supervisor	Supervisor	Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled **"EVALUATION OF THE CLINICAL OUTCOME FOLLOWING LARGE VENTRAL HERNIA REPAIR"** exist in the Department of Surgery, DMC&H, Ludhiana and will be provided to the candidate. We will see that the data being included in the thesis is genuine and is collected by the candidate herself under our supervision and guidance.

Supervisor

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APPROVAL PROFORMA
BY
RESEARCH & ETHICAL COMMITTEE
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA

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Topic of Thesis	EVALUATION OF THE CLINICAL OUTCOME FOLLOWING LARGE VENTRAL HERNIA REPAIR
Likely date of appearing in PG examination	MAY 2022
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Dr. Jaspal Singh (Professor & Head, Surgery)	Mr. A K Jindal (Member, Ethics Committee)
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Approved: Yes / ~~No~~

Dr. Sandeep Puri
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Approved: Yes / ~~No~~

Prof. Arvind Malhotra
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Chairperson
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PROFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

1	NAME OF THE CANDIDATE AND ADDRESS	DR. HARSHIT GUPTA
2	NAME OF THE INSTITUTE	DAYANAND MEDICAL COLLEGE AND HOSPITAL , LUDHIANA
3	COURSE OF STUDY AND SUBJECT	MS GENERAL SURGERY
4	DATE OF ADMISSION OF COURSE	MAY , 2019
5	TITLE OF THE TOPIC	EVALUATION OF THE CLINICAL OUTCOME FOLLOWING LARGE VENTRAL HERNIA REPAIR

6. BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

Hernias are routine general surgical problems that may present in any age group, regardless of the patient's socioeconomic status.[1]

Ventral hernias are defect occurring in the abdominal wall at the site of a prior surgical incision, often due to poor wound healing or the failure of tissue healing.[2] Studies have shown that anywhere between 3 and 20 % patients may develop a ventral hernia after abdominal surgery, especially after midline laparotomy.[2]

Ventral hernias are common post surgical complications of laparotomy, upto 30 % of all patients develop an incisional hernia. One of the elements that facilitate the development of incisional hernias is generally over stressing of the abdominal wall in early stages of rehabilitation.

Certain people are born with a congenital defect — one existing from birth — that causes their abdominal wall to be abnormally thin. They are at a greater risk for developing a ventral hernia. Other risk factors for a ventral hernia include:

Pregnancy, Obesity, History of previous hernias, History of abdominal surgeries, Injuries to the bowel area, Family history of hernias, Frequently lifting or pushing heavy objects.

Ventral hernia repair (VHR) is a commonly performed operation, but analysis of patient outcomes based upon hernia size is lacking. We sought to identify differences in operative repair and post-operative morbidity and mortality after open VHR based on hernia defect size.

Ventral hernias can produce an array of symptoms. Incisional hernias are common complication after abdominal surgery [3]. Patients with incisional hernias often await surgical repair for several months.[4]. Symptoms may take weeks or months to appear. The patient may feel absolutely no symptoms, Or could experience discomfort or severe pain in the area of your hernia, which might grow worse when tries to stand or lift heavy objects..

For a complete diagnosis, a detailed history and a complete general as well as physical examination is required. The imaging tests are of utmost importance to look inside the body for signs of a ventral hernia, which may include:

Abdominal ultrasound, CT, MRI.

Repair of ventral hernia can occur via a laparoscopic or open approach.[5]

Options for surgical treatment include:

Mesh placement surgery: A surgeon pushes tissue back into place and then sews in a mesh, which serves as a reinforcing patch, to keep it in place. This is considered safe and reliable, and mesh placement has been shown to reduce risk of hernia recurrence.

Laparoscopic repair: A surgeon makes multiple small openings and fixes hernia using guidance with a small camera to direct the surgery. A mesh may or may not be used.

Open surgery (non laparoscopic): A surgeon makes an incision adjacent to the hernia, pushes the tissues back into place, and then sews the area shut. A mesh may or may not be used.

Another important advance in ventral incisional hernia repair was the introduction of the components separation technique, in which lateral skin and subcutaneous flap incisions of the external oblique muscles allows midline closure of the rectus muscle.[6]

Surgical repair of ventral hernias, including both post incisional and primary defects, represents a major challenge[7]. Depending upon the size of the defect the repair of ventral hernias can occur via a laparoscopic or open approach. The vast majority of hernias are repaired with mesh given a reduced risk of hernia recurrence compared to suture closure.

No consensus exists on the optimal technique for repair of complex ventral hernias.[8] Laparoscopic approach seems safe and effective even to repair large incisional hernia, the rate of recurrence was higher, but acceptable, if compared to smaller hernias.[9]

Open procedures and large hernia defects were independent risk factors for a later recurrence re-pair. However, patients with large

defects (> 15 cm) seemed to benefit from an open mesh repair compared with laparoscopic repairs.[10] During laparoscopic incisional hernia repair, conversion to open surgery is sometimes needed, especially in cases of large complicated incisional hernias. No guidelines exist for determining when conversions should be considered.[11]

Severe pain is usual after laparoscopic ventral hernia repair (LVHR). Mesh fixation with titanium tacks may play a key role in the development of acute and chronic pain and alternative fixation methods should therefore be investigated.[12]

Hernia patients with a history of recurrent bowel obstructions, chronic bowel dysmotility, and bowel distension have few options for return to a "normal" life. Return of the bowel and adhesiolysis seems the logical surgical solution, but the return of a swollen distended bowel into the abdominal cavity would put patients at a high risk for the development of abdominal compartment syndrome. Hernia repair with large pieces of mesh under tenuous skin flaps to incorporate the bowel into the abdominal cavity has its own set of devastating complications, including mesh infection, extrusion, and fistula formation.[13]

6.2 REVIEW OF LITERATURE

A ventral hernia is a bulge of tissues through an opening of weakness within abdominal wall muscles. It can occur at any location on abdominal wall.

Many are called incisional hernias because they form at the healed site ofpast surgical incisions.

Various risk factors for a ventral hernia include:-

Obesity

History of previous hernias

History of abdominal surgeries.

Injury to bowel area.

Frequently lifting or pushing heavy objects.

Massive ventral hernias pose a serious surgical risk. As the hernia grows in size, the risk of reccurence also becomes higher.

Various studies have been conducted on the clinical outcomes of large ventral hernias depicting the type of procedure done, type of mesh used, post operative reccurence rates, surgical site infections, morbidity and mortality.

In a study conducted by K.E Poruk, 228 patients underwent open VHR during which intraoperative defect size was measured. Patients were split into four groups based upon defect size: less than 200 cm2, 200–300 cm2, 301–400 cm2, and over 400 cm2. Patients with large defects were more likely to present with a recurrent hernia (P = 0.007) and trended towards a history of wound infections (P = 0.07). Operative time was significantly longer as defect size increased (P\0.001). Component separation was most frequently used in patients with defects 200–300 cm2 in size (P = 0.001), in whom primary closure was most likely to occur. While mesh was used in almost all patients, the specific location (overlay only, underlay only, or overlay with underlay) depended on hernia size (P\0.001). Mean length of stay increased with defect size (P\0.001). Larger defect size was associated with increased 30-day morbidity (P = 0.03) but not readmission (P = 0.53), recurrence (P = 0.99), or mortality (P = 0.99).[2]

In a retrospective cohort observational study conducted by Lasses Martinez,

One hundred and twenty patients were included. Mean age was 63.3 years (SD 12.9) and sex ratio was 1.4:1. Seventy-two patients (60%) were ASA III-IV. Forty-five patients (37.5%) had recurrent ventral hernias. Mean defect size was 14.7 cm (SD 3.21) of width. Overall postoperative morbidity rate was 25%. Median hospital stay was 6 days (IQR 4-8). Recurrence rate was 8.3%, after a median follow-up of 16 months (IQR 10-25). Multivariate analysis showed significant association between ASA III-IV, use of Composix Kugel™ mesh, superficial surgical site infection, and the presence of recurrence.[3]

In a prospective study conducted by Wormer BA, 865 International Hernia Mesh Registry patients underwent VHR. Large defect width, length, and area had no association with hernia recurrence or reoperation in both open and laparoscopic VHR. There was a significant increase in operating room time and length of stay for large compared with small width, length, and area for open and laparoscopic VHR patients ($P < 0.05$). Large area was associated with increased seroma and ileus in open and laparoscopic VHR ($P < 0.05$).

There was greater pain and activity limitation at 1 month for large versus small width and area whether repaired laparoscopically or open ($P < 0.05$). When comparing large to small length, there was no difference in pain for all follow-up time points when repaired laparoscopically, but there is significantly increased odds of pain and activity limitation at 1, 6, and 12 mo when repaired open ($P < 0.05$)[14]

A study was conducted by Luis Jose Sanchez over Laparoscopic ventral hernia repair in which laparoscopic operations were completed in 1979 patients, with a mean age of 60.7 years and a BMI of 28.8 kg/m^2. Two hundred and one patient (18.8%) had a previous failed open repair. The average surface area of the major defects were 47.4 and 18.2 cm 2 for post incisional and primary hernias. The mean operation time and post operative stay were 94.4 min and s 3.7 days, respectively. A total of 50 (2.5%) intraoperative and 414 (20.6%) post

operative complications, with reoperation in 38 cases (1.8%) were collected. After a mean follow up period of 24 months, recurrences were recorded in 62. (3.8%). Length of surgery, hospital stay and a previous recurrence were all risk factors for recurrences. Primary hernias had better perioperative outcomes compared to incisional hernias, except for the pain. [7]

A study was conducted by Arash Azin on patients undergoing emergency repair of an incarcerated ventral hernia with associated obstruction/gangrene. A total of 1642 patients were identified. Laparoscopic compared to open repair was associated with a lower rate of 30 day wound morbidity (OR 0.35, 95% CI 0.22-0.57, P<0.001). Laparoscopic repair was not associated with lower 30 day non wound morbidity (OR 0.73, 95% CI 0.51-1.06, p=0.094). Laparoscopic repair was associated with shorter LOS (3.6 days vs 4.3 days , p=0.031). A higher ate of missed enterotomies were observed in laparoscopic cohort. (0.7% vs. 0.0%. p=0.031). There were no group differences with respect to 30 day readmissions, reoperations, or mortality[5].

Study conducted by Opera V described the effectiveness of TAR (Transversus Abdominis muscle technique) for large incisional hernia repair in which 24 patients (14 males) with large median ventral incisional hernias were evaluated. The recurrence in various degrees was present in 18 patients (75%). The average size of the defect was 18,3 cm. in width (12 to 28 cm.). Five patients (21%) developed various wound complications requiring reoperation. Follow-up between 2 and 18 months (11,8 months) without recurrence. The conclusion of this study was that TAR seems to be the "ideal" approach for complex hernias with good immediate outcomes.[15]

In a study conducted by Groene SA on effectors of outcomes in patients with large umbilical hernia :- operative technique, mesh choice, and fixation technique did not impact recurrence or QOL. Repair of umbilical hernia with defects ≥9 cm(2) had a surprising low rate of ideal outcomes (asymptomatic and no recurrence). All patients with non ideal long-term outcomes had preoperative pain and activity

limitations. The data suggested that umbilical hernia should be repaired when they are small and asymptomatic.[16]

A study was conducted by Ammaturo C on Outcomes of the open mesh repair of large incisional hernias using an intraperitoneal composite mesh over 100 incisional hernias treated using the open technique to implant an intraperitoneal mesh (Parietex Composite). Mean follow-up time was 42 months (range 12-96 months). The mean wall defect surface was 95 cm(2) (range 60-210 cm(2)). Twelve percent of patients suffered minor complications: 5 seromas (5%), 3 hematomas (3%) and 4 parietal suppurations (4%). No mesh had to be removed. The recurrence rate was 6%. At 6 months after surgery, no patient lamented pain or discomfort due to foreign body sensation. None of these patients presented intestinal occlusion or enterocutaneous fistulae. The study concluded that the mesh should be implanted in direct contact with the viscera only where absolutely necessary, i.e., when it cannot be implanted in the retromuscular area without creating excessive parietal tension.[17]

A prospective study was conducted by Breinnon X on total of 280 patients who underwent repair of large incisional hernia using Parietex(®) composite mesh. The post-operative mortality rate was 0.35%. Six patients (2%) developed subcutaneous surgical site infection without infection of the prosthesis. Six other patients (2%) developed a deep-seated infection; in three cases, the mesh had to be removed. Nine patients (3.2%) developed recurrent incisional hernia. He came to the conclusion that Large ventral incisional hernias can be effectively treated by the intraperitoneal placement of Parietex(®) composite mesh overlaid by an aponeurotic graft; the incidence of complications in this prospective study was very low [16].

6.3 AIMS AND OBJECTIVES OF THE STUDY

To evaluate the technique and post operative outcomes in the patients undergoing Large Ventral Hernia repair.

7. MATERIALS AND METHODS

7.1 Source of Data

Data shall be collected from all patients with Large ventral hernia, who are admitted during the given time period (Dec 2019 to June 2021) will be taken for study considering the inclusion and exclusion criteria.

7.2 METHOD OF COLLECTION OF DATA

INCLUSION CRITERIA- 1.The patients admitted with "Large ventral hernia" with size of ≥10 cms. at its maximum width and/ or ≥50 sq. cms in its surface area.

2. Patients consenting to participate in the study.

EXCLUSION CRITERIA-

1. Patients with uncontrolled comorbid conditions.
2. Patients presenting with peritonitis.
3. Pre existing enterocutaneous fistula.

STUDY SETTING: The study will be conducted among the patients admitted to the department of General Surgery, DMC & Hospital, Ludhiana.

STUDY DESIGN: Cross-Sectional Study

STUDY TYPE: Prospective Study

METHOD OF COLLECTION OF DATA: Information shall be collected through pre-designed proforma for each patient that is chosen to be a part of the study with detailed history, clinical examination and complete investigational work-up.

SAMPLE SIZE: Time Bound Study.

Period of follow-up: 3 months

Duration of the Study: Dec 2019 to June 2021

OUTCOME

The outcome will be noted in terms of intra-operative approach used and post-operative rate of recurrence, surgical site infection and overall morbidity.

STATISTICAL ANALYSIS

Data will be described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies

(percentages) as appropriate. All statistical calculations will be done using SPSS (Statistical Package for the Social Science) SPSS 21 version statistical program for Microsoft Windows

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.

Not Applicable.

7.4 HAS ETHICAL CLEARANCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3?

Attached herewith

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PROFORMA

Sr. No. ___

NAME: Age: M / F

C R No: Admission No: DoA:

DoD Occupation

Address

History-Present

Swelling- Size

Reducibility

Pain Abdomen (on a scale of 1-10)

Distension

Constipation

Vomiting

Discomfort in daily life (on a scale of 1-10)

History- Past

Date of laparotomy& reason

Diabetes

Hypertension

Cough/COPD

Chemo/Radio therapy

History s/o Connective tissue disorder

Other medications

General Physical Examination :

Pulse Resp BP Temp

i)Ht ii)Wt iii)BMI iv)Waist circumference

Signature of Candidate **Signature of Supervisor**

Systemic examination :

Chest
CVS
CNS
P/A - Site
Distension
Tenderness
Girth
Max width of defect
Approx area of defect
Reducibility:-
Condition of overlying skin:-
Bowel sounds:-

Investigations :-

Hb: TLC: DLC:
Platelet Count:
RFT :- Urea Creatinine
PTI:
INR:

Imaging Studies:-

USG/CT scan- Size of defect;
All other hernias-ostomy site;
Condition of abdominal wall musculature;
Loss of domain

Signature of Candidate **Signature of Supervisor**

Preoperative antibiotic

Surgery

Technique -

Mesh –

Type of mesh used (Material),

- Brand:
- Batch No:
- Manufacture Date:
- Expiry Date:

size and site of mesh

Midline approximation

Duration of Surgery

Post-op

Hematoma
Wound dehiscence
Infection
Duration of hospital stay
Recurrence
Overall morbidity
Overall mortality

After D/C from hospital:-

a) Surgical site infection
b) Recurrence

Recurrence as observed (clinically/USG) at 1 month and 3 months

Remarks:-

Signature of Candidate **Signature of Supervisor**

INFORMED PATIENT CONSENT

Date: _____

I.....D/o, W/o, S/o..... am willing to participate in the study **"EVALUATION OF THE CLINICAL OUTCOME FOLLOWING LARGE VENTRAL HERNIA REPAIR"** The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

.....
Signature of the Witness

Name:

.....
Signature of the patient

Signature of Candidate

Signature of Supervisor

मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____

निवासी _____

इस शोधकार्य "**EVALUATION OF THE CLINICAL OUTCOME FOLLOWING LARGE VENTRAL HERNIA REPAIR**" में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____ _____

गवाह के हस्ताक्षर रोगी के हस्ताक्षर/अंगूठे का निशान

नाम: नाम:

_____

अन्वेषक के हस्ताक्षर

_____

विद्यार्थी के हस्ताक्षर

ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____

ਵਾਸੀ _____

"EVALUATION OF THE CLINICAL OUTCOME FOLLOWING LARGE VENTRAL HERNIA REPAIR" ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

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ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ_____ ਮਿਤੀ_____

ਪਤਾ _____ ਪਤਾ _____

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ਨਿਰੀਖਕ ਦੇ ਹਸਤਾਖਰ

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ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ